MICROPRO WORDSTAR

WITH MAILMERGE & SPELLSTAR

GENERAL, INSTALLATION & REFERENCE MANUALS

VERSION 3

MORROW DESIGNS

WORDSTAR

WITH MAILMERGE & SPELLSTAR

Section 1: General Manual

Section 2: Installation Manual

Section 3: Reference Manual

MAILMERGE

SPELLSTAR

WordStar Manuals

WordStar is now documented in two new manuals for beginners:

o   **WordStar Training Guide**

o   **WordStar Operator's Guide** (to be published some time in 1981)

along with three manuals derived from the old **WordStar User's Guide**. These three replace that manual as of release 3.0:

o   **WordStar General Information Manual**

o   **WordStar Reference Manual**

o   **WordStar Installation Manual**

For an overview of WordStar's features without any detailed explanations, read the **General Information Manual.**

To choose a system on which to use WordStar or to determine whether your present system is adequate, read Section 1 of the **Installation Manual.** If you have just received WordStar and you are ready to make it work on your equipment or if you need to make custom changes, continue reading under the appropriate section (terminals, printers, printer protocols, printer drivers, or label patcher).

If you have a running WordStar system and you are ready to start using it, read Sections 1 and 2 of the **Reference Manual.** Detailed explanations of editing commands may be found in Sections 3-6; explanations of ordinary printing commands, in Sections 7 and 8; explanations of optional MailMerge commands, in Sections 9-12. You will find a summary of all WordStar commands in Appendix A, and error messages in Appendix B.

WordStar is rich in command functions. It has all the basic functions for simple tasks, of course, but it also has many time-saving convenience functions that perform what would otherwise require numerous basic functions. So when you begin learning WordStar, you can start with the most essential commands at first. Then, as you become more proficient, you can pick up the others that you need later on.

Other helpful aids in using WordStar include the screen menus, the Help Menu explanations, the **WordStar Quick Reference**, and the **WordStar Reference Card**. If you need even further help, you can always ask your dealer or, should your dealer be unable to help you, call MicroPro.

Welcome to WordStar Release 3.0!

This new release of WordStar has some outstanding features that will make using WordStar even more rewarding for you. Horizontal scrolling, column move, new menus, and a new WordStar option called SpellStar are the latest enhancements you'll use to turn out perfect documents easily and speedily.

Here's what the new features do and how they do it.

Horizontal Scrolling

Horizontal scrolling is most useful in creating oversized documents, because it gives you a better picture of how a wide document will actually look.

Say you want to produce a document on 11" x 14" paper. You can set your right margin to extend past the last screen column (column 79 for most terminals), as usual. As you enter text past the last column, WordStar will scroll text to the left, so that you have a blank screen area into which you'll continue to enter text.

Before horizontal scrolling, when you entered lines wider than the screen, WordStar put a "+" flag in the rightmost column and continued the text on the next screen line. You couldn't easily see if your right margin was justified or if columns were properly aligned, because the format was broken up by continuation lines. Horizontal scrolling allows you to see all your text as it will appear when printed.

Horizontal scrolling is similar to the familiar vertical scrolling WordStar has always had. With both kinds of scrolling, a "screen window" moves over a document larger than the screen to show you the text you're entering or some other portion you want to see. So, when you enter text in a blank screen area, previously-entered text scrolls off the screen.

It may take you a little while to get used to horizontal scrolling if you've used earlier WordStar versions. Just keep in mind the similarity to vertical scrolling, and when you start wondering "where the words went," be assured that a cursor movement command can take you wherever you want to go in your text. Whenever you're in doubt as to where you are, check the status line for the column number.

The familiar "+" will still be there in the rightmost column to let you know you've exceeded screen width, but your long lines will now keep going horizontally "off" the screen into a new screen area.

As you enter text past the last column, the screen window scrolls right 22 columns at a time.* You can keep scrolling 22 columns at once, up to a maximum right margin of 255. If word wrap is off, you can keep scrolling up to about 32,000 columns!

^QD will move you to the end of your line in increments, if the end is more than 80 columns from the cursor.

Here's an example of how WordStar Release 3.0 handles an oversized document:

Printed Document
< -- 125 characters -- >

Document Onscreen
(first and second screen views)

* The 22-column scroll is the default condition and may be changed. See the WordStar 3.0 Installation Manual, Appendix E.

When you then want to go back to the previous screenful of text, use a command that moves the cursor off the left side of the screen (^A or ^S). The screen window will scroll to the left, and "+" flags will appear in the rightmost column. And, of course, word wrap will automatically take you back to the first screen, placing the cursor at the left margin. ^QS will also always take you directly to the beginning of the line in one scroll.

You should be aware that even if your right margin is less than 80, you could end up with lines that continue beyond the right edge of the screen. For example, this could happen if you are entering or inserting text with word-wrap off, or you insert text that pushes the line past the last column, or you join two paragraphs so that the line that joins them extends beyond the last column.

If you then try to move the cursor into the offscreen portion of the extended line, you may find that much of your text "disappears" from the screen. Don't be alarmed! You can get back to it simply by employing one of the commands that moves the cursor left (^A, ^S, ^QS).

To learn more about horizontal scrolling, read pages 2-12 and 3-4,5 of the WordStar Reference Manual.

Column Mode

Column mode allows you to move, copy, and delete columns of text and numbers. With previous releases of WordStar, you could move only blocks of text that extended from margin to margin. Column mode is particularly useful in creating and editing tables and diagrams.

^KN is the toggle command that gives you either block mode or column mode. The default situation is that block mode is ON, column mode is OFF.

When you move text in WordStar's block mode, the carriage returns move along with the block of text. In column mode, this isn't so. When you move a column composed of lines ending in carriage returns, a block of blank lines will remain in their place. To remove the gap in your document, you will have to delete these blank lines.

You cannot use the command ^KY (Delete block) to delete blank lines while you're in column mode, because column move, copy, and delete commands do not affect carriage returns. So, to eliminate the blank lines, enter the command ^KN to return to block mode, mark the block of blank lines, and delete them with ^KY.

Column mode does not change the way you use WordStar to enter text or edit within a column. For example, it doesn't allow you to word wrap or justify columns. All text entry and edit operations will still affect your text from margin to margin, whether or not you are in column mode.

You should keep this principle in mind when you use print control characters (for underlining, boldfacing, or doublestriking, for example) in columns. You need to make sure the print control characters begin and end on each line of the column you want to be affected.

For instance, if you are creating a table of several columns, and you want the first three lines of the first column to be boldfaced, you can't just use the ^PB command (for boldface) at the beginning of the first line and the end of the third line. If you do, the first three lines of each column will be boldfaced.

Instead, use the ^PB command at the beginning and end of the first three lines of the first column.

                              NO

            This:

            ^Bxxxxxxxxxx   xxxxxxxxxx
            xxxxxxxxxx   xxxxxxxxxx
            xxxxxxxxxx^B   xxxxxxxxxx
            xxxxxxxxxx   xxxxxxxxxx

            produces this result:

            xxxxxxxxxx   **xxxxxxxxxx**
            xxxxxxxxxx   **xxxxxxxxxx**
            xxxxxxxxxx   **xxxxxxxxxx**
            xxxxxxxxxx   xxxxxxxxxx

                              YES

            This:

            ^Bxxxxxxxxxx^B   xxxxxxxxxx
            ^Bxxxxxxxxxx^B   xxxxxxxxxx
            ^Bxxxxxxxxxx^B   xxxxxxxxxx
            xxxxxxxxxx   xxxxxxxxxx

            produces this result:

            xxxxxxxxxx   xxxxxxxxxx
            xxxxxxxxxx   xxxxxxxxxx
            xxxxxxxxxx   xxxxxxxxxx
            xxxxxxxxxx   xxxxxxxxxx

See Section 6 of the reference manual for a complete description of how to use column mode.

New Menus

All the menus in WordStar 3.0 have been revised so that you can read them more easily and locate commands faster. Commands are grouped and labeled according to the jobs they do.

For more about the new menus, see Sections 1 and 2 of the reference manual.

SpellStar

SpellStar makes all your documents letter perfect, by "proofreading" them so you can weed out all spelling and typing mistakes. There are two training chapters (Chapters 19 and 20 of the WordStar Training Guide) that take you step-by-step through the program, and one reference section (Section 13 of the Reference Manual) to use once you have practiced with SpellStar.

The two training chapters assume that you will be using a double-density 8" disk to hold the SpellStar and WordStar files. If you're using single density 8" or 5 1/4" disks, you will need more than one disk for WordStar, SpellStar and the dictionary. This will modify somewhat your use of the training guide, and you should pay particular attention to the notes concerning disk space.

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WORDSTAR
WITH MAILMERGE & SPELLSTAR

Section 1: General Manual

W o r d S t a r

General Information Manual

WS-3630-1 (3.0)

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Section 1
Introduction

AN OVERVIEW OF WORDSTAR

WordStar is a screen-oriented word-processing system with integrated printing. Both initial entry of text and alteration of text previously entered are displayed directly on the screen. Most formatting functions take place immediately, resulting in the display of a true print image; additional enhancements are performed during printout. The MailMerge option adds form letter generation and other capabilities. Originally designed for use under the Command Program Monitor (CP/M), WordStar has since been modified for use on other operating systems.

THE EDITING FUNCTION

WordStar's editing function is used to create and alter documents stored on diskette. Features of the edit function include video editing, automatic disk buffering, on-screen text formatting, powerful editing commands, flexible find and replace commands, help system, dynamic page break display, precise control of text format, and hyphen help.

Video Editing

A portion of the document being entered or corrected is always shown on the terminal screen; additions and corrections are immediately displayed. Text entry is accomplished merely by typing the desired text; command functions such as cursor motion or deletion of text are quickly accomplished with visual feedback.

```
        A:TEST.DOC  PAGE 1 LINE 1  COL 1              INSERT ON
                < < <      M A I N   M E N U      > > >
 *  *  Cursor  Movement  *  *|* Delete *|  * Miscellaneous *  | * Other  Menus *
^S char left   ^D char right |^G  char  |^I Tab   ^B Reform   | (from Main only)
^A word left   ^F word right |DEL chr lf|^V Insert off / ON   |^J Help  ^K Block
^E line  up    ^X line down  |^T word rt|^L Find/Replce again|^Q Quick ^P Print
 *  *    Scrolling    *  *|^Y  line  |RETURN End paragraph|^O Onscreen
^Z line up    ^W line down  |          |^N  Insert a RETURN |
^C screen up  ^R screen down|          |^U  Stop a command  |
L---!---!---!---!---!---!---!---!---!---!---!-------R
WordStar  is  a  screen-oriented  word-processing  system  with
integrated  printing.   Both initial entry of text and alteration
of text previously entered are displayed directly on the  screen.
Most formatting functions take place ■


                        Typical Screen Display
```

Automatic Disk Buffering

The size of a document is not limited by the amount of random access memory
(RAM) in your computer, but by disk capacity.   Text is brought into RAM as
required, with no operator intervention or concern.

On-screen Text Formatting

Text is displayed on the screen as it will appear when printed, thereby
facilitating review and correction before printing. On-screen text formatting
is accomplished with the aid of these features: word wrap; automatic margina-
tion, justification, line spacing, and centering; and paragraph re-form.

WORD WRAP

Paragraphs may be entered at high speed without striking the RETURN key. When
a word exceeds the right margin, WordStar automatically moves the word being
entered to the next line and justifies and redisplays the line just completed.
The RETURN key is used only to indicate the end of a paragraph, blank line, or
other point where a permanent line break is desired. The typist need not break
rhythm to think about the end of the line, nor feel the necessity of looking
up from the material being entered.

AUTOMATIC MARGINATION, JUSTIFICATION,
LINE SPACING, AND CENTERING

With word wrap in effect, each completed line is automatically adjusted to fit
the left and right margins, justified (right-aligned) unless the user has
selected ragged-right format, and, optionally, double-spaced or triple spaced.
A line of text can be centered between the current left and right margins with
a keystroke command.

PARAGRAPH RE-FORM

Text from the cursor position to the end of the paragraph may be "re-formed"
on command to change the margins or line spacing, to change from ragged right
to justified or vice versa, or to clean up after alterations.

Powerful Editing Commands

In addition to the basic functions—cursor motion, scrolling, text deletion
by character, word, or line, and selection of insertion or overtyping—
WordStar's editing commands include the following:

    o   set or clear a **variable tab stop**—ordinary or decimal

    o   move, copy, or delete a **block**

    o   set or move to a **place marker**

    o   **find** or **find and replace** text

    o   write to and read from **additional files**

Flexible Find and Replace Commands

Searching operations and substitution operations can be done once, n times, globally (on the entire document), on whole words only, ignoring case (upper or lower), and/or selectively (the operator is asked whether replacement is to be performed in each instance).

Help System

A menu of commands appears at the top of the screen during editing, or may be suppressed for additional text display area. When the first character of a two-character command is entered, after a short pause the menu automatically changes to show all commands that begin with the key just entered. Additional explanations of various topics can be called up at will, by selecting from the Help Menu (shown here).

```
 ^J        A:TEST.DOC   PAGE 1 LINE 1 COL 1              INSERT ON
                      < < <       H E L P   M E N U      > > >
                                          |                  | * Other   Menus *
   H Display and set the help level       | S Status line    | (from Main only)
   B Paragraph reform (CTRL B command)     | R Ruler line     |^J Help  ^K Block
   F Flags in rightmost column of screen  | M Margins and tabs|^Q Quick ^P Print
   D Ordinary dot commands (P command)     | P Place markers  |^O Onscreen
                                          | V Moving text     |Space bar returns
                                          |                  |you to Main Menu.
 L----!----!----!----!----!----!----!----!----!----!----!--------R
 █

                          The Help Menu
```

Dynamic Page Break Display

Within certain limitations, the page breaks that will occur at printout are indicated on the screen during editing, and change appropriately in response to every insertion or deletion. Thus printing is unnecessary to review page layout or page break positions.

Precise Control of Text Format

WordStar remembers which spaces and carriage returns were typed by the operator and which were inserted by the word wrap or paragraph reform operation. For example, if text is entered with two spaces after periods, the spaces will remain through the initial word wrap and any later reforming, even if they fall initially at end of line and later in mid-line. Anything produced by the automatic formatting features can be altered by explicit editing commands afterwards. All automatic features can be disabled.

Hyphen-Help

WordStar can identify desirable places to divide a word between lines with a hyphen. At each occurence, the operator may decide whether to hyphenate, and optionally adjust the hyphen position. Hyphen-Help inserts **temporary hyphens** which do not print if moved to mid-line by later reforming.

Moving Text and Wide Documents

WordStar allows you to move either an ordinary block of text or a column of text, as in a table. For documents more than 80 columns wide, WordStar also allows horizontal scrolling of text in either direction.

THE PRINTING FUNCTION

WordStar's printing function is used to print documents which have been entered and saved on diskette with the edit function. The print function features **concurrent printing** — one document may be printed while another is being edited. Print formatting features include page formatting, pagination control, special effects, microspace justification, and operator options.
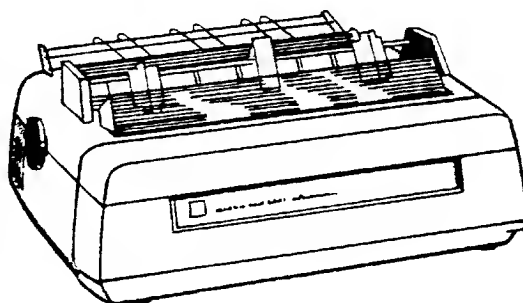
Page Formatting

Each page is vertically formatted with top margin, variable **heading** and **footing** texts, page number, and bottom margin. The page size and margins may be specified with "dot commands" inserted in the document; defaults make such specification unneccessary for typical cases. The heading and footing may be changed as many times as desired throughout the document.

The **page number** appears by default at bottom center, but may be placed at top, bottom, left, center, right, or alternating left and right via specifications in the heading and/or footing texts. The page number may be set to any number desired, or suppressed completely.

Pagination Control

Page breaks occur whenever the page is full, or in response to unconditional page or conditional page directives in the document. Conditional page directives allow specifying that a group of lines is to print together, at the top of the next page if they will not fit the current page. Use of these commands will prevent inappropriate page breaks without the necessity of explicitly readjusting page ends every time changes are made in the document. Page breaks are shown on the screen during editing.

Special Effects

Underline, Double Strike, **Boldface**, and ~~Strikeout~~ are generated at print time, in response to special characters imbedded in the document. WordStar can print these enhancements on regular printers as well as on daisy-wheel printers. During editing, the special characters used to invoke the enhancements are displayed at the beginning and end of the affected text, allowing most standard CRT terminals to be used.

Subscripts (CO_2), superscripts (e^{2x}), **variable character pitch** (pica, elite, or your choice of number of characters per inch), **variable line height** (6, 8, or your choice of lines per inch) and alternate ribbon color are fully supported on daisy-wheel and other incremental printers, and within limitations on Teletype-like printers.

Underline, double strike, boldface, and strikeout may be used freely **in mid-paragraph** as well as in separate lines such as titles; use of these features is completely compatible with word wrap and paragraph reform. Print enhancements may be used in all **combinations**. For example, underlined text and boldfaced subscripts are possible (A_x).

Microspace Justification

When printing justified text on a daisy wheel printer, the white space in each line is evenly distributed between the words and characters for superior appearance. On printers not capable of incremental spacing, and on the terminal display while editing, justification is accomplished by varying the number of blanks between words.

Operator Options

The operator may specify any combination of the following printing features:

- o   starting and ending page numbers

- o   use of "form feed" characters

- o   pausing between pages for single-sheet paper loading

- o   printing exact file contents without page formatting

- o   outputting to a disk file instead of the printer

Print operation can be suspended or aborted at any time while printing is being performed, whether or not a document is being edited.

THE MAILMERGE OPTION

WordStar's MailMerge option allows production of form letters and provides other enhanced printing capabilities. The separately supplied MailMerge option activates the "MailMerge" command. The MailMerge command has all of the capabilities of the regular print function (as described above) except the ability to edit while printing, plus a number of additional capabilities, including the following:

Merging Text

MailMerge can insert variable information into a document and automatically print a copy for each set of data. For example, a personalized letter can be produced for each name and address on a mailing list. The letter is prepared with the edit function in the usual manner, with imbedded directives added to control the merging. The information to be inserted commonly comes from a "data file"; alternately, the operator may be queried for variable information, or values may be set at the beginning of a document for insertion at multiple places in the document.

Data Files

Data files containing mailing lists or other information to be inserted into documents by MailMerge may be prepared with WordStar's edit function or with MicroPro's screen-oriented data entry program, DataStar. The compatible format used also allows generation of data files by programs written in BASIC or another language.

Nested and Chained Printing

One document may invoke another document file by name during printout. "Boiler plate" paragraphs used in many documents can be recorded on separate files and invoked from as many documents as desired; insertion of variable information and reformatting may be performed during printout of the invoked file. A large document that is maintained on multiple files may be printed with a single operator request through the use of a control file containing commands to invoke printout of the various sections.

Screen Display and Input

Commands may be imbedded in a document file to display messages to the operator on the screen during printout, and to request operator input of variable information.

Printing Multiple Copies

A command may be imbedded in a document to cause repeated printing. Such repetition also occurs automatically when variable information is read from a data file. In addition, the operator may request multiple-copy printing when MailMerge is invoked. The operator-requested multiple-copy printout complements that invoked by commands in the file, to permit producing (for example) two or more copies of each letter printed from a mailing list.

Print-Time Formatting

The forming of text into lines, normally done during text entry with WordStar's edit function, is also performed by MailMerge. Thus, variable information may be inserted in mid-paragraph; MailMerge will realign the margins as necessary.

Print-Time Conditionals

WordStar allows you to write conditional statements to control printing of a document. These statements may be compounded and may contain arithmetic and logical terms.

ADDITIONAL WORDSTAR FEATURES

Keyboard Buffering

If the operator types faster than the screen display can respond, the keystrokes are saved until they can be processed. Also, screen updating is usually suspended until WordStar catches up with processing all the keystrokes. Thus, the operator can enter text or type commands at high speed, then pause when he/she wishes to see the latest screen display. The only exception to this is during disk I/O, which is indicated by a message at the top of the screen as well as the usual noise from the disk drive.

Convenient Defaults

While WordStar has many options and user-set quantities, all are set to generally useful values at startup. For example, the left margin is at column 1, the right margin is at column 65 and there are tab stops every 5 columns. The page paper length defaults to 66 lines long for normal 11 inch forms, with margins at the top and bottom. Thus, WordStar can be used initially without even knowing how to change these variables, and there will rarely be need to change more than a few of them for a typical document.

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Section 2
System Requirements

COMPATIBILITY

WordStar is **compatible** with a wide variety of hardware configurations, and can share files with other software:

File Compatibility

The disk files used by WordStar for documents are standard CP/M text files, with very minor additions; a "non-document" edit mode is available to suppress even the minor differences. All formatting features such as word wrap, justification, and settable tabs can be individually enabled and disabled. The formatting performed by the print command can be suppressed.

Thus, WordStar is useful as a **general purpose text editor/print despooler** as well as a self-contained word processing system. It may be used to edit program source files, to input files for other text formatters, for data entry, etc. The print function may be used to print output written to disk by other applications or programs (even while you use the edit function to pre-pare the input for the next run!).

Terminal Compatibility

Once installed, WordStar's video editing function will operate on almost **any CRT terminal or video board** 16 x 64 or larger that has a cursor positioning function and that is accessible as a console device under CP/M (also Apple II 16 x 40). If the CRT has line insert and line delete functions, these will be used for split screen update after changes in the text. If the CRT has a highlighting method such as inverse video or bright/dim, the highlighting method will be used to distinguish menus and other prompts from the text being edited, as well as for distinguishing blocks of text "marked" in preparation for block copy, move, or delete. Certain memory-mapped video boards meeting requirements detailed in the **Installation Manual** can alternately be operated in direct memory access mode for extra fast and smooth screen update.

Printer Compatibility

WordStar will drive almost any printer, whether it is Teletype-like or daisy wheel, and whether it is accessed via CP/M's "list output" logical device or via direct hardware I/O instructions issued by WordStar. OEM daisy wheel and similar printers are supported when used with the MicroPro "I/O Master" S-100 interface board.

For daisy wheel and similar incremental printers, variable line spacing (1 to 127 forty-eighths of an inch), variable character pitch (1 to 127 one-hundred-twentieths of an inch), and automatic microspace justification are supported. For other printers, selection of two character widths is supported (when supported by the printer) and limited user-definable access to other special control sequences is provided. Subscripts, superscripts, and boldface text print differently on non-incremental printers.

It is possible to use a fast printer for drafts and a daisy wheel for finished copy with no special considerations other than creating two versions of WordStar installed for different printers.

EASY INSTALLATION

The INSTALL program supplied with WordStar allows easy menu selection of any of about twenty common **terminal types** and of one of the following printers (see Appendices A, B, and C for complete lists):

- o   **Diablo 1610/1620/1640/1650**

- o   **Qume Sprint 5**

- o   **NEC Spinwriter 5510/5520**

- o   **OEM daisy wheel printer** (Diablo Hy-Type II, Qume Sprint 3, NEC 5500D) connected to either a MicroPro "I/O Master" interface board or an Imsai PIO-4/4 with an Imsai cable G

- o   **Teletype-like** printer

Operation of the INSTALL program is described in the **Installation Manual.** Installation for unusual terminals, video boards, and printers is handled by "patching" the program. Extensive provisions have been made for user patching to accomodate various console and printer devices, as well as to customize other features. Such modifications are discussed in the **Installation Manual.**

THE TERMINAL

The Screen

The screen is capable of displaying at least 16 lines of 64 characters; 24 lines of 80 characters is a common size. We will refer to the leftmost character position on each line as "column 1", and the rightmost character position as "the right-most column" since the actual number of columns on the screen varies from terminal to terminal.

The Cursor

The cursor indicates where the next character will appear on the screen. Depending on the terminal, the cursor may appear as a rectangle, triangle, or underline, and may or may not blink.

Highlighting

Many terminals have some way of making certain text stand out on the screen. One common method is to use bright and dim display; another is inverse video, whereby the characters to be differentiated are black on a white background instead of white on a black background. If your terminal has one of these highlighting methods and WordStar is installed to use it, WordStar will use highlighting to distinguish menus and error messages from text, and to indicate text in the document that has been "marked" as a block.

Insert and Delete Line

Many terminals have special control codes to permit deleting or inserting a line of text on the screen, automatically moving the lines below up or down. If your terminal has these capabilities and WordStar is correctly installed to use them, WordStar will use split screen upward and downward scrolling to achieve rapid screen update as text is edited or scanned.

The Keyboard

Most computer keyboards are similar to typewriter keyboards, but with a number of additional keys. Placement and labelling of keys varies from keyboard to keyboard. A picture of a typical keyboard showing all keys that are essential to use of WordStar is shown below (see Appendix B of the **Installation Manual** for keyboard arrangements of special versions such as the TRS-80 Model I):

```
 !   "   #   $   %   &   '   (   )       =   ^
 1   2   3   4   5   6   7   8   9   0   -   .

ESC  Q   W   E   R   T   Y   U   I   O   P   `   {    RETURN
                                             @

CTRL A   S   D   F   G   H   J   K   L   +   *   }   DEL
                                         ;   :

SHIFT  Z   X   C   V   B   M   N   <   >   ?        SHIFT
                                   ,   .   /

                    space bar
```
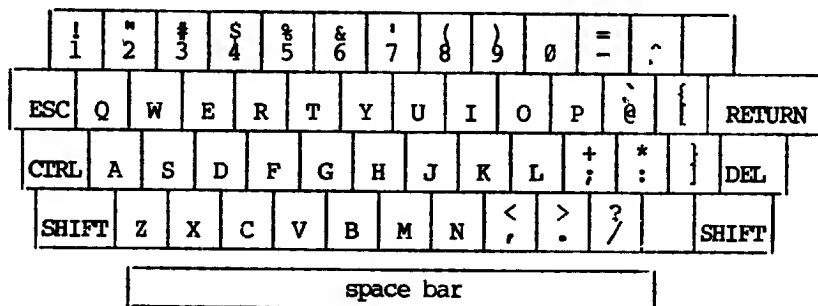
Typical Keyboard

The CTRL key is used like a shift key to enter the **control characters** (control-A through control-Z). To type a control character, hold the CTRL key down while typing the letter. In this manual, "control" is abbreviated "^"; that is, ^A means control-A, typed by holding down CTRL and typing an A; ^B means control-B, etc. Control characters are used for **commands** to WordStar, to tell WordStar to do something; other keys enter document characters.

Your DEL key may be labelled DELETE, RUB or RUBOUT and may or may not be shared with the underscore key and may or may not require SHIFT to activate.

Your ESC key may be labelled ESCAPE.

The RETURN key may be labelled CARRIAGE RETURN or ENTER.

Note that the space bar is for entering spaces. Unlike on a typewriter, you cannot use the space bar to move over characters already on the screen.

A number of additional keys may be present, including:

> **BACKSPACE:** same as ^H; use with WordStar for backspacing.
> **TAB:** same as ^I; use with WordStar for tabbing.
> **LINE FEED:** same as ^J.

Some terminal keyboards have four cursor motion keys with arrows pointing in four directions; these can be activated for WordStar through special installation procedures (**Installation Manual**).

Many terminals have a REPEAT key which may be held down along with another key to type that character continuously; other terminals auto-repeat any character whose key is held down.

OTHER COMPONENTS

The Disk Drives

In addition to the terminal, a computer suitable for WordStar use has one or more **disk drives** into which **diskettes** may be inserted for file storage. To use WordStar, you should know how to load diskettes into your particular drives. Before beginning extensive entry of documents, you should have a supply of blank diskettes. Also, remember that you cannot change diskettes indiscriminately while using WordStar—the appropriate times for changing the diskette in a drive will be described in Section 4 ("Changing Diskettes").

The Rest of the Computer

The remainder of the computer need not be understood to make effective use of WordStar. We will occasionally refer to parts of the computer such as "RAM" (random access memory) for the better understanding of those familiar with such terms; if such words are all Greek to you, don't be concerned.

THE OPERATING SYSTEM

WordStar operates under **CP/M** and a few other operating systems. The operating system is used by WordStar to maintain files of data on diskette, and by the user for a number of utility functions. (Files are discussed in Sections 3 and 4.) After turning your computer on, you must start ("boot") your operating system before you can invoke WordStar. Refer to your computer or operating system instruction manuals for "booting" directions.

When you turn on your computer and boot CP/M, the system's "console command processor" (probably referred to as the CCP in your system manuals) is invoked. It prompts with "A>" and waits for you to enter a command.

WordStar can then be called up by typing "WS" and pressing carriage return, as discussed in greater detail in the **Reference Manual.**

There are also a number of CP/M commands ("console commands") which can be given at this point. Functions performed by CP/M commands needed in conjunction with WordStar use include

> o Determining the amount of space left on a diskette (STAT command in most systems).

    o   Determining the size of a particular file ("STAT filename").

    o   Making a copy of a file on another diskette (PIP command).

PIP may be used to make backup copies of documents, as well as to set up diskettes (Section 4). You may also use the WordStar copy command to copy files (refer to the **Reference Manual**).

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Section 3
Files and Diskettes: Part 1

FILES

Understanding the nature of a file is important to understanding the operation
of WordStar. Since we will refer to files frequently, we will discuss them
and related concepts before proceeding.

What is a file? A file is a collection of characters stored, in order, under
a name, on a diskette.

Text files

Files containing text are used to store documents, such as letters, books,
grocery lists, and so on diskette. When you enter a document into the compu-
ter with WordStar, you are using WordStar to create a file containing the text
of the document. When you make corrections in a document, you are modifying an
existing file.

Documents and Files

Generally, we will use the words "file" and "document" interchangeably to
refer to the textual material being entered or altered with WordStar. Occa-
sionally, of course, what you think of as a "document" may not correspond to a
"file". For example, a book (a large document!) might have each chapter stored
as a separate file, or a commonly used paragraph (less than a document) might
be stored on a separate file for later retrieval for inclusion in future docu-
ments.

Structure of a Text File

The characters are stored in a file containing text in exactly the order you
would type them on a typewriter. Every place you would hit the space bar, a
"space" character is stored in the file. At the end of each line, where you
would return the carriage, there is a "carriage return" character stored in
the file.

Note

There really is a "character" for "carriage return" that is stored
between lines in the file. You can take advantage of this knowledge
when editing a document. For example, if you want to join two lines
together, you delete the "carriage return" at the end of the first
line. If you command the cursor to back up from the beginning of a
line, the cursor goes to the end of the preceding line.

(Technically speaking, there are two characters, called "carriage
return" and "line feed", between lines of a text file. Since
WordStar automatically manipulates the line feed along with the
carriage return, the user need not be aware of the second character
except in a few specific contexts which will be mentioned later.)

The Importance of Saving Text

A file is the only non-ephemeral storage in the computer. Text entered into WordStar (or modification to previously entered text) is permanently filed only when the operator gives one of WordStar's save commands. For example, if you enter text then turn off your computer without saving, the text will be gone when you turn the computer on again. **Save your document!**

NAMING FILES

A file is identified by a "name"; this name is typed whenever the file is referred to, (e.g., to determine its size, edit it, or print it). A name is chosen for a file when it is created. The name may be changed with a CP/M system command (REN) or with the WordStar rename command (see "No-File Commands," **Reference Manual**).

Name and Type

As described in detail in your operating system documentation, a file name contains up to three parts: the primary part is a **name** consisting of one to eight letters and/or digits (most punctuation characters can also be used). Lower case letters may be typed in, but they are taken as equivalent to upper case letters. This name can optionally be followed by a period and one to three more characters called the **"type"** or "extension". Commonly, type DOC is used for documents to distinguish them from other files, but blank (omitted) file types also work. Examples of valid file names as described so far:

        ABC.XYZ   LETTER.DOC   CHAPTER1.DOC
        X   GROCERY.LST   XX5-8-79.DOC

Drive Name

The third part of a file name, a **drive letter**, is optional. It is entered first and separated from the rest of the name with a colon. This letter, A or B (or C or D if you have more drives) specifies the drive (A or B) containing the diskette for the file. Examples:

        A:ABC.D   B:FOO   B:ABRACADA.BRA

When no letter is included in the file name, the file name is assumed to be on the drive currently logged.

A file name as we have just described it may be referred to as an "unambiguous file name" or "ufn" in your system documentation.

Choosing File Names

File names may be chosen any way you wish, provided the same name and type are not already in use for another file on the same diskette, except that you should not use type "BAK" (backup). Choose something that helps you remember the file contents.

DISKETTES AND FILES

The Logged Disk Drive

The "Logged Drive" (or current logged drive or current drive) is the disk
drive used for any file for which no drive letter is entered when the file
name is entered. The logged drive is drive A when the operating system (CP/M)
is started. The logged drive may be changed with a CP/M command (by typing
drive letter followed by a colon to the console command processor), or with
WordStar commands (described later). For example, if you are going to be
working with files on a diskette in drive B, you might find it convenient to
change the logged drive to B to eliminate the need to type B: before each file
name.

WordStar displays the file directory (i.e., the names of all files on the
diskette) of the logged drive. Thus, to view the file directory of drive B,
you must change the logged drive to drive B.

Diskette Capacity

A diskette has a fixed capacity in characters (bytes). This is the total for
all files on the diskette, including non-text files such as the WordStar
program or PIP or STAT as well as your documents. The exact number of charac-
ters varies with the diskette type and system; an ordinary 8-inch single-
density IBM-compatible diskette will hold a total of 241K (243,892) characters
on most systems. The total number of files is also limited (sometimes to 64),
but unless you use very short files, the total number of characters is the
limiting factor.

If a diskette gets full, it may be impossible to save a document that has just
been entered or corrected. It is not permissable to change diskettes after
entry or correction of a file has begun, so check your disk space (STAT
command in most systems) before commencing entry or correction. If the
diskette you are using doesn't have lots of extra space on it, start another.
Watch your disk space!

File Sizes

A printed page of text usually contains two or three thousand characters; the
exact size of course depends on the line length, number of lines, and number
of blank lines. A system console command is available (STAT filename in most
systems) to display the current size of a given file.

While you are learning WordStar, you will probably work with files of moderate
size—several pages only. With such files, it is prudent to keep empty space
on the diskette equal to twice the size of your largest document. When the
space gets less than this, start a new diskette; if you are going to be adding
to existing files, move some of them to the new diskette.

For large files, of course, it may not be practical to keep this much space,
as the file may be bigger than a third the capacity of a diskette. We recom-
mend that, when practical, large documents be divided into several files of
moderate size. For example, each chapter of a book might be a separate file.
We will discuss large file considerations further in the **Reference Manual.**

File Backup

Prudent data processing practice includes keeping additional copies of all data. This permits recovery if a file is destroyed by any unforeseen circumstances such as computer breakdown, power failure, accidentally deleting the wrong file, spilling a cup of coffee on the diskette, etc.

In microcomputer word processing, the best method of backup is to make a copy of the file **on a different diskette,** then remove this diskette and store it safely. Any time you have invested considerable effort in correcting or updating a file, exit from **WordStar** and make another backup. Be sure to label your backup diskettes carefully - next time you go to use the document, you will want to be sure you can identify the latest version!

Files may be copied in most systems with a command called "PIP"; refer to your system documentation. WordStar also has a file copy command that will be described later. Some systems have a command with a name such as DISKCOPY that makes and verifies a copy of an entire diskette; if this is available, it is the best method due to the verification.

Orderly and regular backup procedures take little effort and will save much grief should a file loss or diskette loss ever occur. **Back up your files!**

Section 4
Files and Diskettes: Part 2

SETTING UP DISKETTES

Initializing diskettes requires greater understanding of the operating system commands than other aspects of WordStar use. In some installations, a single individual may learn this process, and make a supply of initialized diskettes for use by a number of typists, who will then need only to understand the operation of WordStar proper. Be sure, however, to keep extra initialized diskettes at hand and make sure all operators know how to monitor the empty space on their diskettes.

WordStar Installation

If you don't already have a copy of WordStar installed to work with your terminal and printer, refer to the **Installation Manual** before attempting to initialize a diskette or to use WordStar.

WordStar Files

The WordStar program consists of the following files:

WS.COM   **Main Program.** The program loaded when you call up WordStar. In order to call up WordStar, you must have this file on the diskette in the drive you call it from (normally A). (You can select another name during installation. For details, see the **Installation Manual.**)

WSMSGS.OVR   **Message File.** The text of all WordStar messages and menus. This file should always be on-line when WordStar is in use. WSMSGS.OVR may be on the diskette in drive A, or in the diskette in the logged drive (if other than A)— WordStar will find it either place.

WSOVLY1.OVR   **Overlay File.** WordStar overlays. This file contains elements of the WordStar program, and must be on-line at all times in order to use WordStar.

MAILMRGE.OVR   **MailMerge File (Optional).** MailMerge overlays. This file, which must be present on the system in order to use the optional MailMerge command, is supplied separately.

Setting Up a WordStar System Diskette

You will normally want to put the following on each WordStar working diskette:

1. The "system image": the portion of the operating system read into RAM whenever the system boots or warm-restarts (this includes when WordStar exits to the system). This is not a file, but is on a reserved area of the diskette, copied from one diskette to another with a special, system-dependent program sometimes called SYSGEN.

2.   The files for any "transient" CP/M commands you wish. We recommend
      STAT.COM and PIP.COM for all diskettes.

3.   The files required by WordStar:

      a.   WS.COM, the WS program (as produced by the "installation"
            procedure, described in the **Installation Manual**).

      b.   WSMSGS.OVR, the WordStar message text file. This file should
            always be on the diskette in drive A, or on the diskette in the
            logged drive.

      c.   WSOVLY1.OVR, the WordStar overlay file. This file must always
            be on the diskette in the logged drive, or on the diskette in
            drive A. We recommend that you keep a diskette containing all
            three of these files in drive A whenever you use WordStar.

      d.   MAILMRGE.OVR (optional). This file must be present on the dis-
            kette in drive A (or in the logged drive) in order to use
            WordStar's MailMerge capability.

In most systems, files (items 2 and 3) are moved with the CP/M utility program
PIP; refer to your operating system documentation. Once your WordStar is
installed, a WordStar command may also be used to move files.

Work Diskettes

A diskette in drive B can be used for document file storage only. It need
have none of the above items on it (provided WSMSGS.OVR and WSOVLY1.OVR are on
the diskette in drive A), making its entire capacity available for document
storage. (However, it is often to include items 2 and 3 for convenience.)

Note

For WordStar to operate, there must always be a diskette in drive A,
and also in the logged drive if other than A.

CHANGING DISKETTES

The Simple and Safe Rule

Change diskettes only when the system is ready to accept a command (A> or B>
prompt), and after changing diskettes type control-C (^C). Don't forget the
^C! Changing diskettes at the wrong time, such as when WordStar is editing
or printing a file, or forgetting the control-C results in errors under some
versions, and **destroys existing files** under other versions. Under certain
systems, ^C is unnecessary, but it does no harm.

The WordStar Exception

When WordStar is running, diskettes may be changed if WordStar is neither
editing a file nor printing. The no-file menu (described later) must be on
the screen, and printing must be inactive. ^C is not used in this case.

Used with caution, this exception is a convenience: it makes it unnecessary to re-invoke WordStar to edit a file on a different diskette, and eliminates the need to have WS.COM take up diskette space when working with large files.

There is no general provision for changing diskettes in the midst of an edit. Make sure you have plenty of working space on your diskette before invoking WordStar.

<p align="center">**Caution**</p>

<p align="center">Never change diskettes while editing or printing!</p>

FILE CHANGES DURING EDITING

When initiating editing with WordStar, the operator enters a file name. This may be the name of an existing file to be altered, or the name of a new file into which text is to be entered. The processes of altering an existing document and entering a new document are the same in WordStar, except of course that the new document starts out empty.

Saving a Document

When an existing document is edited, the changes are entered temporarily into an ephemeral **working document**; no change is made in the permanent diskette storage until one of WordStar's save commands is given. When you save the document, the previous version of the file is changed to type "BAK" (backup), and the contents of the working document are filed under the file name of the previous version (see the illustration below under "Summary").

For example, if you edit a previously entered file named LETTER.DOC, after saving it the new version will be on the original file name (LETTER.DOC) and the version of the document that existed before the edit will now be called LETTER.BAK.

When a new document is entered, the text goes into the working document as it is entered and is permanently recorded on diskette only when a save command is given. After saving the first time, the entered text will be on the specified file name. There will be no BAK file since there was no prior version.

To review, the **working document** is the version of the document containing changes and additions made during editing. The original file is not altered until you give a save command (and even then the original version is kept, with type BAK). If the edit is interrupted for any reason—operator command, power failure, etc.—the working document is lost and the original file is unchanged (non-existent for a new file).

The most important point about the working document is its transitory nature: working document text is not permanently recorded on diskette until you _save_ it. **Save your document!** For convenience, WordStar contains a "save and re-edit" command which does a complete save, then initiates editing of the file just saved. Use of this command periodically during long edit sessions is highly recommended.

Restoring the Backup File

Alternately, if you make changes in a document, then decide before saving that
you want the original kept, you may use **WordStar's** abandon command as des-
cribed later. This command discards the working document, leaving the origi-
nal file unchanged.

If you discover after saving that you made drastic errors while editing file
LETTER.DOC, you may recover the prior version by using operating system com-
mands to copy or rename LETTER.BAK to LETTER.DOC, or by using WordStar's "read
additional file" command.

Note that only **one** prior version is kept. If you want to keep a version
indefinitely, make a copy on another file name—say LETTER.OLD or LETTER.001.
If the "save and re-edit" command is used during an edit, the BAK file (upon
completion) will be the version at the last "save and reedit".

Summary

We have made three important points in the above paragraphs:

1. Disk files aren't changed at all until a save command is given, and
    any work not saved will be lost.

2. When an existing file is edited and saved, the **new version** is filed
    under the original primary name and type.

3. When an existing file is edited and saved, the **previous version** is
    filed under the original primary name and type BAK.

```
 _____                      _____
|                   |                    |                   |
|      Working      |                    |                   |
|                   |                    |                   |
|     Document      |                    |     TEXT.DOC      |
|                   |   ==========>      |                   |
|     in RAM        |                    |    (Disk File)    |
|                   |                    |                   |
|    (TEXT.DOC)     |                    |                   |
|                   |                    |                   |
 -------------------                      -------------------

                                          _____v_____
                                         |                   |
                                         |                   |
                                         |                   |
                                         |     TEXT.BAK      |
                                         |                   |
                                         |    (Disk File)    |
                                         |                   |
                                         |                   |
                                          -------------------
```
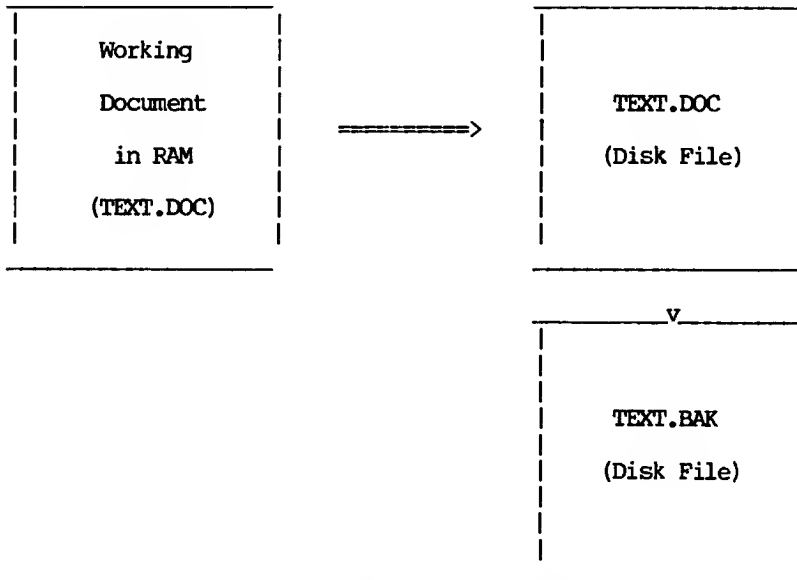
Sample Backup Procedure

File Update in Detail

We will now describe the implementation of the working document and the file changes which occur when a file is edited in a more precise and technical manner, and point out implications for large documents. (New and non-technical readers may skip the rest of this section).

During an edit, the working document is stored in RAM and, for large documents, on temporary disk files that are created and erased automatically. Initially, the beginning of the original (input) document is read from disk into RAM for display and possible modification. As you proceed through the document, additional text is automatically read as required.   If and when the capacity of your RAM is reached, some of the text from the beginning of what is in RAM is automatically written to a temporary output file.

Upon saving, the rest of the text is copied to this temporary file. Then, any existing BAK file is deleted, the input file is renamed to type BAK, and the temporary file is renamed to the file name being edited, thus becoming the output file.

If you move the cursor backwards through the file over more characters than are contained in RAM (the number of characters RAM will hold depends on how much RAM you have), text is read back from this temporary output file, and, if necessary, text from the **end** of that in RAM is written to another temporary file. This backing up operation is logically transparent, but it is slow and uses extra diskette space for the additional working file.

Thus, large files can be edited most rapidly and with minimum diskette space requirements by working forward through the file, from the beginning to the end. To move from near the end to near the beginning, use a "save and reedit" command (^KS) as described later.   Saving is a relatively quick operation because, if the cursor is near the end of the document when the save command is given, much of the text is already in the temporary file which is renamed to become the output file.

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Section 5
Editing a Document

This section introduces the concepts and terminology relating to WordStar's on-screen formatting. Section 6 describes those concepts that apply to printing. Descriptions of the specific editing commands and print directives are given in the **Reference Manual.**

LINE-FORMING

Here we will introduce WordStar's on-screen line formatting features, word wrap and paragraph reform, and define a number of terms used when discussing WordStar.

Margins

WordStar uses left and right margins that determine where on the page the text appears and how long the lines are. Like a typewriter, the left margin and right margin are set to the desired columns; the difference between them determines the line length. By default, the left margin is column 1 and the right margin is column 65; commands for changing the margins will be described later.

Line Spacing

WordStar allows you to set single, double, triple, or greater line spacing; the default is single.

Justification

"Justified" text has additional spaces inserted between the words to make the right end of each line in a paragraph come out exactly at the right margin; "ragged right" text does not have these spaces. The bulk of this manual is an example of "justified" text; this particular paragraph is ragged right to provide an example of the difference. WordStar's justification is on by default, but may be turned off to produce ragged right text. Some users prefer ragged right, e.g. for correspondence which they wish to appear hand-typed.

Note

Justified text is always displayed on the screen with whole spaces inserted to achieve justification; this leads to uneven word spacing. However, if you have a daisy wheel printer capable of incremental spacing and WordStar is properly installed for it, the printed copy will be "microspace justified" with the white space added evenly throughout the line.

Margins, line spacing, and justification are all applied automatically by WordStar to text as it is entered, or upon command to previously entered text. We will refer to this process as forming the text; and will describe the process in more detail.

Forming a line

Given a collection of words, WordStar forms a "line" in the document as
follows:

1. Establishes the left margin: inserts the necessary number of spaces
   to move from column 1 to left margin column.

2. Places as many words as fit on the line. If all the words fit, then
   this is a partial line and WordStar stops here. Otherwise, saves
   the excess words for later lines and does steps 3 and 4.

3. If justification is on, adds spaces between words to align right
   margin.

4. Adds a carriage return to the end of the line--or two for double
   spacing, three for triple spacing, and so on.

Word Wrap

When word wrap is on (as it is by default), lines are automatically formed as
text is entered by the operator. The operator types words, without using the
return key within a paragraph. On the first keystroke, indentation to the
left margin occurs; whenever text is typed beyond the right margin, a line is
"formed" as described, and the partly-typed word that did not fit on the line
is moved down to the next screen line and over to the left margin. This all
happens automatically; the operator just keeps typing, and the lines form on
the screen as they will print.
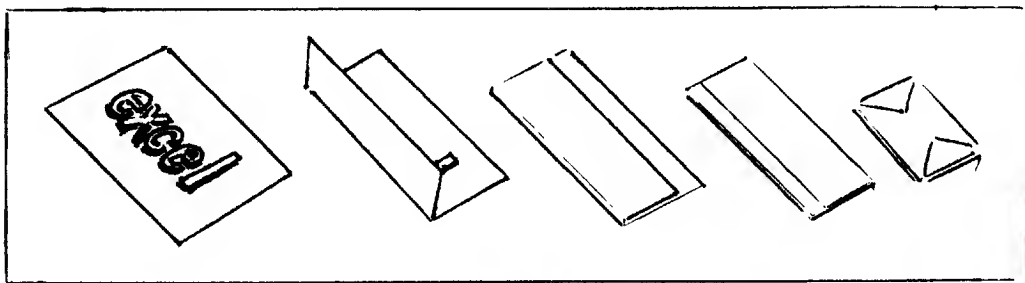
Word Wrap

REFORMING A PARAGRAPH

A document is a changing entity. After entry, one usually makes revisions and
corrections. During entry, one can pause in typing, read the screen, and
immediately start rewriting. Or, one might want to change the margins or line
spacing of text already entered, or change text from justified to ragged right
or vice versa. Thus, WordStar must be able to "reform" text already entered.

Text is reformed by applying the line forming procedure described above re-
peatedly until all words to the end of the paragraph have been formed into
lines. First, of course, all the spaces and carriage returns added by pre-
vious forming are removed.

This brings us to a very important point. WordStar must know where the paragraph ends. When reforming, the words in a paragraph are regrouped, frequently changing the line break points. However, the reforming process must not continue across the end of a paragraph - the next paragraph must begin on a new line, even if the last line of the preceding paragraph was not full of words. The same situation occurs with tables, columnar lists, etc: the user wants the text in these divided into lines as originally entered; WordStar should never remove the carriage returns between the lines of a table or list. Similarly, user-entered blank lines should not be removed from the document.

Thus, there is the need to record in the file permanent, user-entered line breaks that WordStar will not alter when reforming, as distinct from the line breaks between lines in a paragraph, which are supplied by WordStar and which may be moved or removed as necessary during the reforming of the paragraph. This distinction is handled via permanent and temporary carriage returns.

Carriage Returns

PERMANENT ("HARD") CARRIAGE RETURN

A permanent ("hard") carriage return is a carriage return used at a point in the file where the user wants a line break, as at the end of a paragraph or between lines of a table. All permanent ("hard") carriage returns are explicitly entered by the user, usually with the RETURN key. Permanent carriage returns are never moved or removed by WordStar's reforming process. The presence of a permanent (or "hard") carriage return at the end of a document line is indicated on the screen by a "<" in the rightmost column of the screen.

TEMPORARY ("SOFT") CARRIAGE RETURN

A temporary ("soft") carriage return is a carriage return supplied by WordStar in the process of forming lines, either under word wrap during text entry or during paragraph reform upon user command. Temporary carriage returns will be moved or removed freely by WordStar upon later reformation of the text; thus, they should be present only between lines of a paragraph or at other points where the user does not want a fixed line break. The presence of a temporary (or "soft") carriage return at the end of a line is indicated on the screen by a blank rightmost column.

To review, all carriage returns supplied by WordStar in the process of automatically forming lines are "soft" carriage returns and may be moved or removed by WordStar if the text is later reformed; all carriage returns entered by the user are "hard" carriage returns (indicated by < in the rightmost screen column) and will not be moved or removed except by an explicit editing command.

When entering text under word wrap, do not use the RETURN key between lines of a paragraph, but do use the RETURN key wherever you want a fixed line break (e.g., the end of a paragraph, between lines of a table, after headings and titles, etc). To make a blank line (as between block paragraphs) press the RETURN key a second time.

Spaces

WordStar also makes a distinction between the spaces entered by the user and the spaces supplied by the system:

PERMANENT ("HARD") SPACE

A permanent ("hard") space is a space entered into the file by the user, by pressing the space bar. Permanent (or "hard") spaces are never deleted by WordStar's reforming process.

TEMPORARY ("SOFT") SPACE

A temporary ("soft") space is a space supplied by WordStar in the process of forming lines: the spaces to the left of the left margin, and the spaces added between words to achieve justification (when justification is on). All existing temporary (or "soft") spaces are deleted before a line is reformed, as an insertion or margin change may reduce the number of spaces needed.

WordStar never forgets spaces typed by the user. Spaces that fall at the end of a line are not visible, but they will reappear if later reforming makes them fall in mid line. User-entered spaces at the beginning of a paragraph (after a hard carriage return) are forced to the right of the left margin, like any other character.

When entering text under word wrap, wherever you want a space, type a space. For example, indented paragraphs can be formed by pressing the space bar a number of times just after pressing the RETURN key to end the previous paragraph. This will cause the first line of the paragraph to be indented from the left margin, i.e., a number of columns more than the rest of the paragraph.

If you like two spaces after periods, type that way, and WordStar will never print the sentences closer than that. The spaces may fall at the end of the line when initially entered, but they will be remembered. (The sentences may also print farther apart, because of justification.)

Hyphenation

WordStar has a "hyphen-help" feature that allows you to hyphenate words when reforming paragraphs for better line appearance. When WordStar is reforming a paragraph and encounters a word that will not fit at the end of a line, a prompt will be displayed to allow you to insert a hyphen if desired before continuing to reform the paragraph. WordStar will indicate a position for the proposed hyphen; you may place the hyphen elsewhere within the word if you prefer. After the word has been hyphenated, or if you instruct WordStar to skip the hyphen, WordStar will continue reforming the paragraph. Hyphen-Help may be turned on or off as desired.

Summary of Reforming

Text that has been entered with the RETURN key used only at paragraph ends, blank lines, and other fixed line breaks can be partially or wholly reformed at will to change the margins, line spacing, or to change between justified and ragged right format. There is nothing done by word wrap as text is entered that cannot be redone as often as desired by the paragraph reform command. Thus, one can initially concentrate on entering the text of a document without regard to format; subsequently, one can manipulate the margins, spacing, and justification to achieve the desired appearance.

Section 6
Printing a Document

PRINT FORMATTING

Section 5 described line forming, which is done as text is entered and altered and is recorded in the file and visible on the screen. This section introduces the additional formatting operations done as text is being printed by the print function, under the control of optional print directives entered in the file.

Pagination

The print function divides the text into pages, and can add headings and page numbers. Page breaks (both conditional and unconditional) can be specified by the user where desired; otherwise the print function starts a new page whenever a page is full.

Since the appropriate places for page breaks can change as text is added, deleted, or moved, the page breaks are not recorded in the file. However, the places where they will fall are displayed on the screen by the dynamic page break display feature, described later in this section.

Special Effects

Subscripts, superscripts, boldface, underline, and other special printing effects are activated by special characters entered into the file before and after the desired text. During editing, these characters display as control characters; during printout, the print function responds appropriately to produce the desired effect. These features may thus be used freely in mid-paragraph — they fall through word wrap and paragraph reform with no special user consideration; there is no need to manually align the underline with the text to be underlined, or to align the subscript with the space it prints in.

OTHER PRINTING FEATURES

Changes in line height, character width, and ribbon color, insofar as supported by your particular printer, can also be performed by the print function in response to directives imbedded in the file.

User control of print formatting is accomplished via print directives imbedded in the file. WordStar has two types of print directives, print control characters and dot commands.

Print control characters are single-character directives for functions such as begin/end underline or change ribbon color; print control characters can be used freely in mid-word, mid-line and mid-paragraph.

Dot commands are special lines entered into the file for functions such as setting the paper length, or specifying a page heading, or causing a new page to be begun. All dot commands have defaults suitable for normal use.

Print Control Characters

Print control characters are single-character commands entered into the file
to specify functions, including begin/end underline, begin/end strikeout or
change ribbon color.

For example, a control-S character in the file turns underlining on if off, or
off if on. To print

> The word <u>underline</u> is underlined.

type the following:

> The word ^P^Sunderline^P^S is underlined.

and see this displayed on the screen:

> The word ^Sunderline^S is underlined.

(where ^S represents a control-S character—not a caret and an S!)

As described in more detail in the **Reference Manual,** a print control character
is entered into the file by typing a special prefix (^P), then the desired
character.   If typed without the prefix, control characters perform editing
command functions.

As another example, a control-H character in the file causes the the character
after the control-H to print in the same position as the character before the
control-H. This facility is useful for printing accent marks over letters, as
used in a number of European languages.   To print

> le dix-septième siècle

type the following:

> le dix-septie^P^H`me sie^P^H`cle

and see this displayed on the screen:

> le dix-septie^H`me sie^H`cle

All the print control characters are described in the **Reference Manual.**

Print control characters can be used freely in mid-line and in mid-paragraph;
they are treated as other file characters and fall through word wrap and
paragraph reform with no special operator consideration. When a paragraph is
reformed, the underlines, etc. move with the words; a phrase can be underlined
with two ^S's, one at the beginning and one at the end. It doesn't matter if
the end is on a different line from the beginning.

However, the columns they occupy on the screen are disregarded in forming
lines, since the characters themselves don't print.   Thus, if a line in a
paragraph contains an underlined word, that line will appear longer when
justified on the screen, because of the print controls to start and stop
underline.   Each print control displays as an ^ and a letter.

Dot Commands

Dot commands are special lines entered into the file for purposes such as
positioning the text on the paper, setting the page number, or starting a new
page. Dot commands do not in themselves print, but control the printing. The
dot commands have defaults suitable for normal use; you can begin using
WordStar without using dot commands at all.

The general form of a dot command begins with a period (hence the name), in
column 1 (i.e., immediately after a carriage return), followed immediately by
a 2-letter code in upper or lower case identifying the function, optionally
followed by a number, text, or other argument depending on the particular
command. A number, if used, may be separated from the code by nothing, 1
space, or several spaces. Any additional text on the same line (up to and
including the next carriage return) is assumed to be a comment and is not
printed. Here are three examples:

    .MT 5   Indicates that a 5-line margin is to be used at the
                                        top of each page

    .HE Section II   Indicates that "Section II" is to be printed at the
                                        top of each page until another .HE command is given

    .CP 12   Starts a new page if fewer than 12 lines remain on
                                        the current page

Full descriptions of all the individual dot commands will be given in the
Reference Manual. WordStar can be initially learned using the default page
format. Dot commands are being introduced here because they will be referred
to frequently in subsequent sections. Dot commands are normally used in con-
junction with documents rather than programs. Since dot commands invoke print
functions, they do not appear in the printout unless print formatting is sup-
pressed.

Dot commands are entered into the file like any other text, using the edit
function as will be described in the following sections. Dot command lines
are not counted as lines in the page for page break determination, since they
do not print unless print formatting is suppressed.

The print function has no error messages for dot commands. Unrecognized dot
command lines have no effect, and are not printed: they are assumed to be
comments. However, unrecognized or incomplete dot commands are brought to
your attention during editing with a "?" in the rightmost column of the screen
line.

Avoid document lines intended for printout that begin with a period in column
1, as they will be taken as dot commands and not printed. For example, be
sure that a space or other character appears before any ellipsis you use. A
"trick" to use in this case is to place control characters (such as ^S^S) in
column 1. The control characters will be dropped when your document is
printed. (See the **Reference Manual** for details.)

Dynamic Page Break Display

Dynamic Page Break Display is the ability to continually determine and display, while the document is being changed, where the page breaks will fall during printing. The pagination information is displayed in two ways: the page and line where the cursor is positioned are displayed on the top line of the screen, and the following display appears at each page boundary:

---P

A page break is displayed wherever a full page would occur on printout, and wherever a page break is caused by an unconditional page (.PA) or a condi-tional page (.CP) dot command.

Dynamic page break display responds to those dot commands which influence the number of lines printed on a page:

    .LH (line height)   .MT (top margin)

    .PL (paper length)   .MB (bottom margin)

However, response is limited to these commands at the very beginning of the file only, as documents are handled with a constant number of lines on a page. (The print function will handle arbitrary changes in vertical page format; the dynamic paging limitation relates only to display of page breaks while editing.)

If one of those dot commands appears in the file in a position where dynamic page break display cannot handle it, a warning message appears next to it on the screen and the command is ignored for page break display purposes.   In this case, the printed page breaks may not be the same as those displayed on the screen during editing.

Dynamic page break display can be turned off and is always disabled in the non-document edit mode.

Appendix A
Terminals Supported

In general, WordStar may be run on any 48K Z-80, 8080, or 8085 microcomputer system that runs under CP/M or one of its derivative operating systems. Here are the terminals to which WordStar is known to be compatible, listed in five groups (terminals supported with standard installation, terminals supported with special installation, terminals available on request, terminals for which special versions of WordStar are available, and terminals currently under evaluation or development).

STANDARD INSTALLATION

The following terminals are supported through simple responses to the standard installation menus:

Beehive 150   MicroTerm ACT-IV

Compucolor II   MicroTerm ACT-V

Cromemco 3100   Perkin-Elmer 550

Flashwriter I   Processor Tec SOL/VDM

Flashwriter II   SDS VDB-8024 VDU

Hazeltine 1500/10/20   Soroc IQ-120

Heath H-19 (Zenith Z-19)   Soroc IQ-140

Hewlett Packard 2621A/P   SWTPC CT-82

IMSAI VIO module   TEC Model 571

Infoton I-100   Televideo 912/920

Lear-Siegler ADM-3A   TRS-80 Model II with FMG CP/M

Lear-Siegler ADM-31   TRS-80 Model II with LIFEBOAT CP/M

                                     Visual 200

SPECIAL INSTALLATION

The following terminals are supported through special responses to the installation menus (available from your dealer):

ADDS Regent 25   DEC VT-100

ADDS Regent 45   DIRECT VP800/B

ADDS Regent 60   Lear-Siegler ADM-2

ADDS VT-100   SD Systems

DEC VT-52   Televideo 950

The following terminals, similarly supported, will soon be available:

Beehive DM30   Lear-Siegler ADM-42

DataMedia Model 2500   OMRON 8030B

DataMedia Model 3025   Perkin-Elmer OWL-1200

EECO Model D300/400   Polymorphics VTI module

ELBIT DS-1920X   Teleray Model 12

ELBIT DS-4801X   Teleray 3900

Infoton 400

ON REQUEST

The following terminals can be supported on request, with help from MicroPro's
Beta test menu. (MicroPro's Technical Services Department requests your
opinions after testing installations on any of these terminals.)

ADDS Regent 20   Hazeltine 1400/10/20

ADDS Regent 40   IBM 3101

Ann Arbor 6080   TRS-80 Model II w/P&T CP/M

Data General D100/D200   TRS-80 Model II with Cybernetic CP/M

SPECIAL VERSIONS

Special versions of WordStar are available for the following terminals:

Apple II 40-column   Heath H-89 (Zenith Z-89)
                                    with Lifeboat CP/M
Apple II 80-column   Heath H-89 (Zenith Z-89)
  M&R Sup'R'Term* (and others)   with Magnolia CP/M
  Videx Videoterm+ (and others) Heath H-89 (Zenith Z-89)
                                    with Zenith CP/M
Archives   Superbrain
                                    with DOS Version 1.0/2.0
* Turns the cursor off   Superbrain
+ Leaves the cursor on   with DOS Version 3.0

UNDER CONSIDERATION

The following terminals are presently under consideration for possible future support:

Ampex Dialogue 80   MicroAngelo VDU

Datamedia DT80/1   Screensplitter VDU

DEC VT132   SSM VB1B Video module

GTC Model 101   SSM VB2 VDU

Hazeltine 1552   SSM VB3 VDU

Hazeltine Series 80   TRS-80 Model III

IS 64 x 16 VDU   V-100 VDU

Ithaca Audio 64 x 16 VDU   Xitec SCT-100 VDU

NOT SUPPORTED

Wordstar cannot currently be run on the following systems:

PET   SWTP Co.

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Appendix B
Formats Supported

FORMATS SUPPLIED BY MICROPRO

The following disk formats are supplied by MicroPro:

Altos	ISC Intecolor Model 8063/8360/8963
Apple II 13-sector	Micromation
Apple II 16-sector	Micropolis Model II
Black Hawk Micropolis Model II	Mostek
CDS Versatile 4	North Star single-density
Compal-80	North Star double-density
Cromemco System III	Nylac Micropolis Modiel II
Delta	Pertec PCC 2000
Digital Microsystems	Research Machines 8-inch
Dynabyte DB8/2	SD Systems 8-inch
Dynabyte DB8/4	Spacebyte
Exidy Sorcerer w/Lifeboat CP/M	Superbrain
Heath H-89 (Zenith Z-89)	Tarbell
Heath H-8 with H17/H27	TEI 8-inch
Icom 3712	TRS-80 Model I 5-inch
Icom 3812	TRS-80 Model II
IMS 8000	Vector Graphic
IMSAI 8-inch	Vector MZ

FORMATS SUPPLIED BY MICROPRO O.E.M.s

The following disk formats are supplied by original equipment manufacturers (O.E.M.s) of MicroPro products:

Archives   RAIR

Gnat (WordStar only)

FORMATS SUPPLIED BY DISTRIBUTORS

The following disk formats are supplied by various MicroPro distributors:

Altair 8800 disk	
AVL Eagle	Micropolis Model I
BASF System 7100	MITS 3200/3202
Black Hawk single-density	MSD 5-inch
CDS Versatile 3B	Nylac single-density
Cromemco Z2D	Ohio Scientific C3
Digi-Log Microterm II	Processor Technology Helios II
Durango F-85	Quay 500/520
Exidy Sorcerer with Exidy CP/M	RAIR
Icom 2411 micro floppy	REX
IMS 5000	Sanco 7000 5-inch
Imsai 5-inch	SD Systems 5-inch
Intel MDS	TEI 5-inch
Kontron PSI-80	Vista V80 5-inch, single-density
Meca 5-inch	Vista V200 5-inch, single-density

Appendix C
Printers Supported

WordStar currently supports two kinds of printers, specialty printers and teletype-like printers.

SPECIALTY PRINTERS

The following bidirectional printers, which offer microspace justification, are supported through responses to the standard menus:

Diablo 630	NEC 5500 w/Diablo Hi-Type II interface
Diablo 1355/55A/55WP Hi-Type I	NEC 5510/20 w/serial interface
Diablo 1610/20 w/serial interface	NEC 5515/25 w/Diablo look-alike serial
Diablo 1640/1650 (not 1641)	NEC 5530
ITOH StarWriter 1500	Qume Sprint 5 w/serial interface
ITOH Model 1540	Xerox 1710/20
ITOH VISTA V300	Xerox 1730
	Xerox 1740/50

TELETYPE-LIKE PRINTERS

The following Teletype and Teletype-like printers, which generally support all WordStar features except bidirectional printing and microspace justification, are also available through responses to the standard installation menus:

Alphacom Sprinter 40	ID 440G
Anadex DP-8000	Malibu 165
Anadex DP-9500/01	MicroTek MT-80
Base II Model 800B	MPI Model 88
Centronics 700-9	Okidata Microline 80
Centronics 730	Paper Tiger 445G
Centronics 737	Paper Tiger 460G
Centronics 779	Paper Tiger 560

Comprint 912	Teletype 40
DEC LA34	Teletype 43
Eaton LRC7000	Quantex Series 6000
Epson TX-80	Texas Instruments TI-810
IBM Selectric (serial)	Xymec HY-Q 1000

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WORDSTAR
WITH MAILMERGE & SPELLSTAR

Section 2: Installation Manual

W o r d S t a r

Installation Manual

WS-3630-1 (3.0)

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C   Specific Terminals

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F   **The Printer Patch Area (USER4)**

Section 1
System Requirements

This section is intended for readers who wish to select a computer system on which to use WordStar, and those who wish to determine whether WordStar can be used on their present system.

WordStar's system requirements are an 8080/8085/Z80 Microcomputer with adequate RAM, floppy disk drives, a CRT terminal or video board, and the CP/M operating system. You will normally also want a printer, or access to another system with a printer and an operational WordStar.

DISK DRIVES

Two floppy disk drives are highly recommended, to allow you to back up files conveniently and set up new working disks, but a single-drive system can be used if you have a means of copying files from diskette to diskette and the disk capacity of one disk is sufficient to support the essential WordStar files (about 70K) and leave two times the size of the biggest file you will want to edit as unused space on the disk.

TERMINAL OR VIDEO BOARD

You may use any CRT terminal or video board providing a display area of at least 16 lines by 40 columns (and not larger than 120 lines by 250 columns)* capable of displaying ASCII codes 20 thru 7E hex and capable of directly positioning the cursor by sending line and column. The terminal must be accessible as the "console" device under CP/M; certain video boards (see Section 5) may also be accessed on a direct memory mapped basis for fastest display.

CRT's with line insert, line delete, and character-by-character inverse video or bright/dim highlighting may provide enhanced performance with WordStar; direct-memory-mapped video boards provide the best performance.

Selecting a Terminal

To be able to run WordStar, a terminal must have absolute cursor positioning. In addition, WordStar must "know" the control sequences used by the particular terminal or video board to position the cursor and perform other (optional) functions; these are set by the "installation" procedure, Section 2. WordStar may be installed for many common terminal types via a simple menu selection.

Serial Interface

As a serial interface for the terminal, you may select the MicroPro "I/O Master" S-100 interface board. This board's 32-character "FIFO" buffer permits the fastest text entry even during disk accesses and simultaneous printing and editing. Further, this board allows using the inexpensive "OEM" versions of the various manufacturers' daisy printers (next page). (Centronic's port and interrupt handler may also be used.)

    * Theoretical limit. The actual limit is determined by the RAM available
    on your system.

RANDOM ACCESS MEMORY

For a terminal with a 24 x 80 or smaller screen, including space for the opera-
ting system (CP/M) and text work areas, a minimum of 45K RAM is required.   To
edit and print at the same time, 3K more RAM is required. Terminals with
unusually large screens require, in addition to one byte for each of the first
1920 characters, one additional byte for each character position on the screen
in excess of 1920 total characters. If the board requires more than 2096
bytes, WordStar will require 2 bytes for every byte over 2096. (If you have
one of the video boards that WordStar can access in direct memory mapped mode,
2K less RAM is adequate.)

While WordStar is perfectly usable in the minimum amount of RAM, additional RAM
is recommended for systems which will be used extensively for documents longer
than a few pages. Additional RAM increases the amount of text that can be held
in RAM simultaneously; thus, more RAM speeds editing and increases productivity
by reducing disk access. (Additional RAM does not affect maximum file size;
file size is limited by the capacity of the diskette, not of the RAM.)

PRINTERS

WordStar can be installed to drive virtually any printer. The features avail-
able are limited to those supported by the printer. Special installation is
required to access some features of some printers. Underlining, boldface
(multi-strike method), and double strike require a printer that can overprint
(most printers have this capability). Microspace justification, continuously
variable line height, continuously variable character pitch, subscripts, super-
scripts, and boldface (offset and restrike method) require a daisy wheel or
other printer capable of incremental motion.

High-Quality Printers

The following printers are fully supported by WordStar and the installation
program supplied with WordStar. All of WordStar's capabilities including bi-
directional printing are available with these printers; simple menu selections
(detailed in Section 3) will install WordStar for these printers:

> Serial Printers:
>
>> Diablo 1610/1620
>> Diablo 1640/1650
>> Qume Sprint 5
>> NEC Spinwriter 5510/5520
>
> OEM Printers*:
>
>> NEC 5500D
>> Diablo Hy-Type II 1345, 1355, 1355WP
>> Qume Sprint 3 (with Diablo-compatible cable adapter)
>
>> * MicroPro "I/O Master" Interface Board (or equivalent) required

The MicroPro "I/O Master" S-100 interface board allows use of the less-expen-
sive "OEM" daisy printers and provides simple installation, maximum printing
speed, and good response when editing while printing. The NEC 5500D printer
(or equivalent) with a PA-1 board may be used for either an Altos or a TRS-80
II terminal.

Other Printers

All other printers ("Teletype-like" or "non-daisy" printers) are treated in two classes, those that can backspace and those that cannot. The ability to return the carriage without feeding the paper is assumed; if this ability is lacking, overprint lines, boldface, and double strike will not work, but WordStar will be otherwise functional. WordStar can be installed for a basic "Teletype-like" printer of either class via selection from a menu. Through special installation, additional printer capabilities of the printer can be supported: choice of two character pitches, two ribbon colors, and up to four other special functions.

Suggested Setups

For a large installation, you will probably want a line printer for fast draft printout and daisy wheel printers for high quality final copy printout. When multiple work stations are used, it is practical to omit the printer (commonly the most expensive hardware item) on some, using these as editing stations only and moving documents on diskette to one of the printing systems.

WordStar can access the printer as the CP/M "list device" or by direct I/O to the printer interface ports. Provision is available for the "ETX/ACK" communications protocol required to run serial daisy wheel printers at maximum speed without buffer overrun.

Sections 2-5 provide details on installing WordStar to work with your terminal and printer. Sections 6-8 provide details on special installations. Special installations are required for setting up systems not handled by an ordinary installation and for modifying the operation of WordStar features (see "Features and Defaults" below). For a complete description of situations where a special installation is required, see Sections 6, 7, and 8.

FEATURES AND DEFAULTS

With an ordinary installation, WordStar comes up with all features set a certain way by default. When you run the INSTALL program, as described in Sections 2-5, you will automatically get the defaults. However, it is possible to alter the standard defaults, i.e., to reset the defaults for WordStar features to other values of your own choosing. Table 1-1 shows the standard defaults that you will get if you make no alterations.

If you would like further information on setting up a custom WordStar system, you may purchase **WordStar Customization Notes** from MicroPro.

Table 1-1. Defaults for Parameters

Item	Document Mode	Non-Document Mode
Left Margin	Column 1	Column 1
Right Margin	Column 65 (80-column screen) Column 60 (64-column screen)	Column 65 (80-column screen) Column 60 (64-column screen)
Variable Tab Stops	Cols. 6, 11, 16,..., 56	Cols. 9, 17, 25,..., 73
Variable Tabbing	ON	OFF
Word Wrap	ON	OFF
Justification	ON	OFF
Ruler Display	ON	OFF
Page Break Display	ON	Inoperative
Print Control Display	ON	ON
Soft Hyphen Entry	OFF	OFF
Hyphen-Help	ON	OFF

Section 2
Installation Considerations

The "installation" procedure sets up WordStar to work with your particular
terminal and printer. This procedure enables one distributed WordStar version
to work with a wide variety of peripheral equipment. For most cases, instal-
lation is accomplished by entering choices from menus, as described in Sections
2-5. For exceptional terminals and printers, and for achieving refinements in
installation, there are extensive provisions for "patching" by a programmer as
described in Sections 6-8.

Special versions of WordStar are distributed for a few microcomputer systems
with unusual requirements. These special versions are described in Appendix A;
any special installation or operation considerations relating to a particular
version are given there. Check Appendix B; if your system is shown, follow any
instructions given there.

TERMINAL INSTALLATION CONSIDERATIONS

The INSTALL program supplied with WordStar can automatically supply the neces-
sary control codes for many of the most common terminals, including these:

Compucolor 8001G	Beehive 150 / Cromemco 3100
Flashwriter I	Flashwriter II
Hazeltine 1500	Hewlett-Packard 2621 A/P
IMSAI VIO	Infoton I-100
Lear-Siegler ADM-3A	Lear-Siegler ADM-31
MicroTerm ACT-IV	MicroTerm ACT-V
Perkin-Elmer 550 (Bantam)	Processor Tech Sol
Soroc IQ-120	SWTPC CT-82
TEC Model 571	TeleVideo 912/920
Visual 200	

If your terminal is not shown, you will need to consult the manufacturer's
manual to determine its control codes for cursor positioning (and possibly for
other functions), then "patch" them in as described in Sections 6-8. For hints
regarding some specific terminals, such as the settings required for option
switches, check Appendix C. If your terminal is shown, follow any instructions
given there.

PRINTER INSTALLATION CONSIDERATIONS

Daisy Printers and Teletype-like Printers

WordStar supports two classes of printers: daisy wheel and similar printers and
"Teletype-like" printers (i.e., most other printers). We will discuss the
general characteristics and capabilities of these classes of printers here, and
also other considerations relating to printer installation. Appendix D gives
additional specific information for each particular printer supported. Section
3 describes the actual printer installation procedure used once you know what
choices you wish to make.

DAISY WHEEL AND SIMILAR PRINTERS

Daisy wheel printers are printers capable of incremental horizontal and verti-
cal motion, allowing use of variable line height, variable character spacing,
subscripts, and the rest of WordStar's print enhancements as described in the
Reference Manual. "Microspace Justification" is automatically implemented when
printing on a daisy wheel or similar printer. Since the control sequences are
different for each daisy wheel or similar printer, WordStar must be specifi-
cally installed for the printer that is to be used. WordStar can be installed
for one of the following daisy wheel printers via "menu" selection as will be
detailed in Section 3:

     NEC 5500D OEM printer with MicroPro "I/O Master" Interface Board
     Diablo 1300 series Hy-Type II OEM printer with MicroPro "I/O Master"
     Qume Sprint 3 OEM printer with adapter and MicroPro "I/O Master"
     Diablo 1610/1620*
     Diablo 1640/1650
     Qume Sprint 5
     NEC Spinwriter 5510/5520

     * Also used for the the NEC 5500D with a PA-1 board on Altos or TRS-80 II

Selecting one of the above printers from the menu installs WordStar to make use
of all capabilities of that printer. WordStar will print bi-directionally if
any of the above printers is selected.

"OEM" Daisy Printers

WordStar may be installed to drive the NEC 5500D, Diablo Hy-type II 1300
series, and Qume Sprint 3 (with cable adapter) OEM printers through the Micro-
Pro "I/O Master" interface board with a single menu selection (as will be
described in Section 3). For Altos and TRS-80 II terminals, WordStar may also
be installed to drive the NEC 5500D through the PA-1 interface board. Users of
OEM printers and the "I/O Master" interface board may disregard the rest of
this section and go on to Section 3.

"Serial" Daisy Printers

The printers not noted as "OEM" in the above list are usually supplied with a
"Serial" interface. When using a serial daisy printer with WordStar, you will
generally wish to set the printer and the computer interface to 1200 baud (120
characters per second), the highest transmission speed supported by these
printers. Such printers operate far below their speed capability with WordStar
when set to 300 baud or less. Use of 1200 baud generally requires use of a
"communications protocol" to prevent loss of characters; use of a communica-
tions protocol usually precludes access to the printer as the "CP/M List De-
vice". Read "Communications Protocols" and "Printer Drivers" later in this
section carefully and check Appendix D with regard to your printer, before
attempting to install WordStar to drive one of these printers at 1200 baud.

"TELETYPE-LIKE" PRINTERS

This class includes almost all printers other than daisy wheel printers—any
printer that prints the ASCII printing characters (codes 20 through 7E hex) and
responds to the carriage return and line feed codes, but not the more sophisti-
cated printing features. Using a Teletype-like printer, WordStar can under-
line, strike out, double strike, and overprint. Boldface is printed with three

strikes (or as specified by a customer through patching). Subscripts and super-
scripts are printed in the line below or above if that line is blank, otherwise
in the line in which they appear. Variable line height is not available. A
choice of two character pitches and two ribbon colors is available through
special installation, described in Section 7. Right-justification of printout
on a Teletype-like printer is accomplished by inserting whole spaces between
words, as on the screen during editing.

A daisy wheel or similar printer will operate with WordStar installed for a
Teletype-like printer, but only the Teletype-like printer capabilities will be
available, and bi-directional printing will not occur.

Two menu selections are provided for Teletype-like printers:

    A. Any Teletype-like Printer
    B. Teletype-like Printer that Can Backspace

Selecting A or B above installs WordStar to make use of the basic capabilities
common to all Teletype-like printers. Use of additional capabilities of speci-
fic printers, such as character pitch change or ribbon color change, can be
enabled via special installation as detailed in Section 7. The backspacing
selection produces faster printing of underline, boldface, double strike, and
backspace for moderate usage. (For a larger amount of underlining, etc. in a
given line, overprinting becomes faster.) Use selection B if you know your
printer can backspace; if you are in doubt as to whether your printer can
backspace, Selection A will work.   .

Other Printers

Generally, WordStar is installed for printers that are not Teletype-like (nor
among the specific daisy wheel and similar printers supported) by making one
of the two "Teletype-like" selections in the installation dialog. Additional
patches, if required, are covered in Section 7.

Both of the "Teletype-like" printer selections (A and B above) assume the
printer will return carriage without advancing to the next line when sent a
carriage return code that is not followed by a line feed code. If your printer
cannot return its carriage without advancing to the next line, but can back-
space (Selection B), overprint lines will not print correctly, but WordStar
will be otherwise operational. (Overprint lines are discussed in the **Reference
Manual**.) If your printer can neither return the carriage without feeding to
the next line nor backspace, use Selection A and avoid use of underline,
strikeout, boldface, double strike, backspace, and overprint lines.

If your printer can return the carriage independently of advancing the paper,
but does these functions under control of characters other than the standard
ASCII carriage return and line feed codes, WordStar can be made fully
operational with your printer by patching the appropriate control strings as
described in Section 7.

Another selection on the Printer Menu, "Half-Line Feed Printers", is intended
to facilitate installation for printers that can advance the paper one-half
line at a time; the half-line advance is utilized in printing subscripts and
superscripts. After making this selection, patches will probably be required.
See Section 7 ("Custom Printer Installation") along with Appendices D and E.

Communications Protocols

A "communications protocol" is a convention whereby a (serial) printer tells WordStar when to stop transmitting characters (while those already received by the printer are being printed) and when to resume transmitting.

Communications protocols as discussed here are not pertinent to "OEM" or Centronic's interfaced printers; users with the NEC 5500D, NEC 5530, Diablo Hytype II, or Qume Sprint 3 OEM printers interfaced with either the MicroPro "I/O Master" board or the PA-1 board may disregard this subsection.

A communications protocol is not necessary with a (serial) daisy wheel or similar printers interfaced at 150 baud or less, and generally not at 300 baud. However, if you have such a printer interfaced at that speed, you will want to change it to 1200 baud when you discover how slowly it prints.

Unless hardware and cabling options are available and have been implemented, a communications protocol is always necessary with a serial daisy wheel or similar printer interfaced at 1200 baud. If no communications protocol is installed, the printer's buffer will overflow and characters will be lost.

We will describe the available communications protocols in general here; see Appendix D for specific notes relating to your printer. The protocols supported by WordStar are "ETX/ACK protocol" and "XON/XOFF protocol". Both communications protocols require that the computer be able to receive characters from the printer as well as transmit characters to the printer. This complicates installation when a communications protocol is to be used, since the normal method of accessing a printer under CP/M, the "list device", provides only for transmission of characters from the computer to the printer.

ETX/ACK PROTOCOL

Under this protocol, WordStar sends a "message" consisting of a specified maximum number of characters, followed by an "ETX" character (03). After printing all characters up to the ETX, the printer transmits an "ACK" character (06H) back to the computer, thus signalling WordStar that another message may be transmitted. All daisy wheel and similar printers supported by WordStar can use this protocol, though some printers require specific optioning to activate it. See Appendix D and the printer manufacturer's documentation.

XON/XOFF PROTOCOL

Under this protocol, the printer transmits an "XOFF" character (DC3 ASCII code) to the computer when WordStar should stop transmitting characters, then transmits an "XON" character (DC1 ASCII code) when transmission may resume. XON/XOFF protocol is supported as an alternate protocol by some daisy wheel and similar printers; use XON/XOFF instead of ETX/ACK only if other considerations, such as other software to be run on the same computer, necessitate its use, or if you have an unusual printer that will perform XON/XOFF but not ETX/ACK.

Printer Drivers

Users with NEC 5500D, Diablo Hy-Type II, and Qume Sprint 3 OEM printers inter-
faced with the MicroPro "I/O Master" board may disregard this subsection
(selection of OEM printer / I/O Master interface combination during installa-
tion automatically selects the required driver). Users who wish to drive a
serial daisy printer at 1200 baud must read this section carefully. Users of
NEC 5500D OEM printers with PA-1 boards for Altos and TRS-80 II terminals
should use the list device (see below).

The normal method whereby a program accesses the printer under CP/M -- the
"list output device" -- does not support receiving characters from the printer,
as required by "communications protocols" (preceding subsection).

Also, the list output device does not allow the program to determine whether
the printer is busy or ready to receive another character via software. Deter-
mination of whether the printer is busy ("Printer busy test") is not essential
to WordStar operation, but is desirable as it improves keyboard response and
printer speed during concurrent editing and printing.

To handle communications protocols and printer busy tests, and accommodate
special cases, WordStar provides several methods for accessing the printer.
Each method of accessing the printer is termed a printer driver. When instal-
ling WordStar, one of the following printer drivers may be chosen. The para-
graphs that follow discuss each printer driver in detail. Selecting the desired
printer driver is accomplished during installation by selecting from a menu
(Section 3).

> CP/M "List Output" Device (LST:)
> CP/M "TTY:" Console Device
> CP/M "CRT:" Console Device
> Port Driver (direct input/output by WordStar)
> Custom Subroutines

CP/M LIST OUTPUT DEVICE (LST:)

This driver outputs characters to the printer via the printer driver in your
operating system. The list output device is the simplest way to access your
printer if your printer requires no communications protocol (preceding sub-
section) and no printer busy test is desired. (There is a patch that allows
Spinware to check busy for faster operation from WordStar.) If your printer
requires a communications protocol (as all daisy wheel and similar printers
interfaced at 1200 baud do), you may wish to choose another of WordStar's
printer driver options, or you may wish to make use of WordStar's provisions
for installation of a user-supplied list device character input routine. (See
Section 7.)

**The "CP/M list output device" choice will work correctly from WordStar only if
your operating system can already output characters to the printer as the list
device.** Suitable installation of the operating system is often necessary to
enable it to drive a specific printer. In some cases, the computer dealer or
manufacturer supplies a CP/M with a suitable printer driver already installed.
In other cases, the user must install a suitable subroutine in the "BIOS"
portion of the operating system if the system is to drive the printer. Of
course, such system installation is not necessary for WordStar use unless
WordStar is installed to do printer output via the CP/M list device.

In many systems, the "list output device" (LST:) is a "logical" device which can be assigned to one of several "physical" devices. If this is true of your system (check your system manual), you must either give the necessary command or provide the necessary system setup (SETUP.COM or CONFIG.COM) to assign LST: to the desired printer device before you can print with a WordStar installed to use the CP/M LIST DEVICE.

CONFIG.COM, CONFIGURE.COM and related files allow you to set up LIST DEVICE conditions via a kind of menu. Usually you have to run the "CONFIG" program and answer the questions (CONFIG is short for "configure" which is similar to MicroPro's INSTALL program). Look up the procedures for running one of these programs in your CP/M manual.

A more universal set-up is that procedure available via the STAT.COM program. Typing STAT LST:=LPT: will assign the LIST DEVICE to the physical device and its driver associated with the LPT:. This nearly always works, but is transient (ie. is lost when the system is re-booted); while the CONFIGURE set-up tends to be permanent (either optionally or by definition.)
To verify that your operating system drives your printer and that LST: is indeed assigned to the printer, type control-P at the system prompt (A>), then type additional characters. All characters typed on the console (and everything that appears on the display) should be printed on the printer until you type another control-P. This is an unqualified test of proper LIST DEVICE operation.

CP/M has no provision for inputting characters from the list output device, as required by the communications protocols, nor does it have a uniform provision for a printer busy test. However, WordStar provides for installation of user-supplied printer character input and printer busy test subroutines (such as those found in Spinware) for use in association with CP/M list output device printer output. (See Section 7.)

<div align="center">Caution</div>

> Do not attempt to install or use code **in the operating system** to implement ETX/ACK protocol when driving a Diablo or Qume daisy wheel printer. For WordStar to work with these printers under this protocol, the protocol **must** be executed by WordStar.

ALTERNATE CONSOLES

In many versions of CP/M the "console" is a logical device (CON:) which can be assigned to any one of four physical devices, usually called "TTY:", "CRT:", "BAT:", and "UL1". The terminal used by the operator is one of the "physical" consoles and must be the active one when WordStar is invoked; WordStar can access the printer as another of the consoles. WordStar can be installed to access the printer as the TTY: or CRT: console device by making an appropriate selection at the Printer Driver menu (Section 3). The other two physical consoles can be accessed via patching (Section 7).

Accessing the printer as an alternate console allows inputting characters from the printer, as required by communications protocols, without system software modifications or patching. The TTY: or CRT: printer driver is often the most convenient printer driver choice when a communications protocol is required, as by a daisy wheel printer set to 1200 baud. Accessing the printer as an alternate console does not provide a printer busy test unless the user installs his own subroutine (Section 7).

TTY: Alternate Console Device Printer Driver

This driver accesses the printer as the "TTY:" console device. This driver will support communications protocols and may be used if your CP/M operating system supports multiple consoles and the terminal from which WordStar is operated is not the "TTY:" device.

CRT: Alternate Console Device Printer Driver

Similar to the preceding, this driver accesses the printer as the "CRT:" console device. This driver will support communications protocols and may be used if your CP/M supports multiple consoles and the terminal from which WordStar is operated is not the "CRT:" device.

PORT DRIVER

WordStar's "port driver" bypasses the operating system and does input-output directly to the printer interface, thereby eliminating any complications introduced by the CP/M operating system. The port driver supports character input from the printer and includes a printer busy test; the port driver thus handles communications protocols (preceding subsection) and allows WordStar to provide the best keyboard response during concurrent editing and printing.

Installation of the port driver requires that you specify whether your printer interface uses "I/O ports" or is "memory mapped". If in doubt, assume "I/O ports" as this case is most common. Installation of the port driver requires determination of the output data port number (or memory address if memory mapped), output status port number, output status bits, and, if a communications protocol is to be used, the input data port, input status port number, and input status bits. If you don't know the port numbers for your interface, the WordStar installation program can be directed to search for the ports (as will be detailed later).

Note

Experience has shown that the DETERMINE function is extremely limited as a tool for determining available ports. For Dynabute, Altos, and Vector Graphics ports, refer to Sections 4 and 8 and Appendix F. If you don't find the information there, ask your dealer about supplementary Application Notes.

If your printer interface involves more than one output data port (or memory mapped location), one output status port, one input data port, and one input status port, WordStar's port driver is not applicable. Otherwise, if you know your printer's port numbers (or memory mapped addresses) and status bits, or can determine them in your system with the installation program's automatic search features, the port driver is the best printer driver choice where a communications protocol is required or a printer busy test is desired.

CUSTOM SUBROUTINES PRINTER DRIVER

Choosing this printer driver selection causes WordStar to call user-coded, user-installed subroutines to output to the printer, input from the printer (for communications protocols), and determine whether the printer is busy.

This choice may be used when the CP/M list device won't work (e.g., because a communications protocol, and thus printer character input, is required) and the port driver won't work (e.g., because an unusual printer uses several data or status ports).

After selecting "Custom Subroutines" on the INSTALL menu, it is up to you to code and install the necessary routines. See Appendix E for listings of the area in which to install your code, Section 7 for discussion.

Summary of Printer-Related
Installation Selections

OEM PRINTER WITH I/O MASTER

OEM Printer with MicroPro I/O Master Interface Board: No complications discussed in this section are pertinent. Choose "I/O Master / OEM Printer" at the INSTALL program's printer menu (as will be described in Section 3). For any OEM printer with Spinware and either the I/O Master board or the PA-1 board, select "L" (CP/M list device) and "D" (Diablo 1610/20). INSTALL will present no further printer-related selections.

TELETYPE PRINTER

Teletype-like (Non-Daisy) Printer: If your CP/M operating system can already drive the printer, specify "Teletype-like" at the printer choice menu, specify "None" for communications protocol, and specify "CP/M list output device" for printer driver. Alternately, you may wish to use the port driver for better keyboard response during concurrent editing and printing.

DAISY WHEEL AT 300 BAUD

(Serial) Daisy Wheel or Similar Printer Interfaced at 300 Baud or Less: If your CP/M can already drive the printer, choose the specific printer type at the printer menu, specify "None" for communications protocol, and specify "CP/M list output device" for printer driver. Or use the port driver if desired, for better keyboard response during concurrent editing and printing. You will want to change your printer to 1200 baud as soon as possible so WordStar can print faster.

DAISY WHEEL AT 1200 BAUD

(Serial) Daisy Wheel or Similar Printer Interfaced at 1200 Baud: You will need to use a communications protocol and a driver that can input as well as output characters. See Appendix D for specific discussion of your printer. Specify the particular printer type at the printer choice menu. Specify ETX/ACK protocol, and set the printer to match, unless unusual considerations dictate using a different protocol.

PRINTER DRIVER

For printer driver, try using the port driver. However, if your operating system supports multiple consoles and your printer is already accessible as one of the console devices, you may wish to consider using the TTY: or CRT: alternate console driver. The CP/M list output device printer driver cannot be used with a communications protocol unless you patch in your own Printer Character Input routine (Section 7).

Exception: If your 1200 baud printer is a NEC Spinwriter 5510/5520, you may be able to make a special cable instead of using a communications protocol (see Appendix D). If you use the special cable, you may specify "None" for protocol and "List output device" or "Port driver" for printer driver.

Printer Configuration

Some printers have option switches which must be correctly set. These switches may be on an external control panel, on a control panel under the printer cover, or buried on circuit boards inside the printer. Common switches include the following:

AUTO LF or LOCAL LF (makes printer line feed upon receiving a carriage return code): must be OFF.

AUTO CR (makes printer start a new line if an overlong line is printed): OFF recommended.

SPEED: Must match the rate at which your computer transmits characters.

PARITY: Set to ignore parity ("M" position on some printers).

Communications Protocol: A "communications protocol" must be used with (serial) daisy wheel and similar printers interfaced at 1200 baud (120 characters per second), as discussed above. With many printers, use of a communications protocol requires setting switches or adding jumpers on circuit boards inside the printer. See Appendix C and your printer's documentation.

FORM LENGTH: Should be set to match paper in use if USE FORM FEEDS print option is to be used.

SET TOF: Press after positioning paper at top of form, if USE FORM FEEDS print option is to be used.

The Page Intentionally Left Blank

Section 3
Installation Procedure

THE DISTRIBUTION DISKETTE

The diskette (or diskettes) you receive upon purchasing WordStar contain the
following files:

WSU.COM	Uninstalled WordStar; installation for your terminal and printer is achieved by running INSTALL as described in this section.
WSMSGS.OVR WSOVLY1.OVR	WordStar message and overlay files; must be on diskette in logged drive or drive A whenever WordStar is in use.
INSTALL.COM	WordStar installation program; used to install (customize) WordStar for your computer configuration.
EXAMPLE.TXT	File of sample text demonstrating some WordStar features.
MAILMRGE.OVR	Additional overlay file for the optional MailMerge feature (extra—possibly on a separate diskette).

Creating a System Diskette

Follow these steps to create a new system diskette to work from:

1. Format a new disk.

2. Copy a system onto this disk.

3. Copy PIP.COM onto this disk.

4. Insert this new disk into the boot drive (a:) and boot it.

5. Insert the original distribution disk into a second drive (b:).

6. Copy INSTALL.COM and WSU.COM from the distribution disk (drive b:) to the new working disk (drive a:) using PIP.

7. Run INSTALL as described in detail below. INSTALL will create a new file called WS.COM, with WordStar set up for your particular system.

8. Once you are certain that WordStar has been properly installed, erase INSTALL.COM and WSU.COM from your new working disk (drive a:), **but not from the distribution disk (drive b:).**

9. Now copy all overlay files (WSMSGS.OVR, WSOVLY1.OVR, and possibly the optional file MAILMRGE.OVR) from the distribution disk (drive b:) to your new working disk (drive a:) using PIP. (Type pip a:=b:*.ovr after a>.)

10. If you have room on your working disk, you may also want to copy STAT.COM and FORMAT.COM onto it.

11. Remove the distribution disk from drive b: and store it in a safe place.

Be sure to keep the original distribution diskette. If you wish an update in
the future, you may need to return it to MicroPro.

Initiating Installation

To initiate WordStar installation, insert the diskette containing the files
copied from the distribution diskette, type control-C (if your system is al-
ready up), or else cold-start (boot) the system, and type the command:

        INSTALL

and press RETURN. INSTALL will take several seconds to load, after which it
will display a sign-on message and ask its first question. At this point, the
screen should appear as follows:

```
|---------------------------------------------------------------------|
|                                                                     |
|                                                                     |
| A>INSTALL                                                           |
|                                                                     |
|                                                                     |
|                                                                     |
|                                                                     |
|   COPYRIGHT (C) 1981, MicroPro International Corporation            |
|                                                                     |
|   INSTALL release x.x for MicroPro WordStar release n.n             |
|                                                                     |
|                                                                     |
| Do you want a normal first-time INSTALLation of WordStar?           |
| (Y = yes;   N = display other options): ▮                           |
|---------------------------------------------------------------------|
```

In response to this question, type Y. (If you type N, additional options not
needed for initial installation as described here are displayed. These instal-
lation options will be described in Section 5.) In response to the Y, INSTALL
will tell you what it is going to do—create an installed WordStar on file
WS.COM, obtaining the uninstalled version from file WSU.COM—and ask for your
confirmation—as follows:

        This will INSTALL the WSU.COM on the current drive, save
        the result on file WS.COM on the current drive, and then
        run the INSTALLed WordStar.   OK (Y/N): ▮

Type Y. (As with the previous question, an N here gets the installation
options, which are not needed for an initial installation.) An error message
will occur at this point if WSU.COM is not on the current (logged) drive. (If
you need futher explanation of any error message displayed while you are
installing your WordStar, refer to Appendix A.)

SELECTING THE TERMINAL TYPE

A terminal choice "menu" appears next, as follows:

```
|------------------------------------------------------------------|
|                                                                  |
|                                                                  |
|   MicroPro WordStar release n.n serial 000000                    |
|                                                                  |
|        *****  WordStar TERMINAL MENU #1 *****                    |
|                                                                  |
| A  Lear-Siegler ADM-3A        C  Lear-Siegler ADM-31             |
| D  Hazeltine 1500             E  Microterm ACT-IV                |
| F  Beehive 150/Cromenco 3100  G  IMSAI VIO                       |
| H  Hewlett-Packard 2621 A/P   I  Infoton I-100                   |
| J  Processor Tech SOL / VDM   K  Soroc IQ-120                    |
| L  Perkin-Elmer 550 (Bantam)  2  Terminal Menu #2                |
| 3  Terminal Menu #3           Z  None of the above               |
|                                                                  |
| PLEASE ENTER SELECTION (1 LETTER): ■                             |
|------------------------------------------------------------------|
```

If your terminal is shown on the menu, enter the corresponding letter. If your terminal is not shown, type "2" or "3" and another menu showing additional terminals will be displayed.

If your terminal type is not shown on any of the menus, you must make a custom terminal installation as described in Section 6. Enter Z for "None of the above" in order to bypass the terminal menus; patch the required control functions (as determined by study of Section 6, Appendix E, and your terminal's technical manual) into WordStar using INSTALL's patcher (end of this section) or your operating system's debugger.

After the terminal type letter is entered, INSTALL will display a brief message confirming the terminal type and ask

        OK (Y/N):

If you made an error or wish to change your selection, type N, and the TERMINAL TYPE question will be asked again. Upon repetition, a choice U for "NO CHANGE" will appear on the menu. When you answer Y to OK (Y/N):, INSTALL will proceed to printer choice. You can type "B" at this or any following question to return to the terminal choice menu.

PRINTER-RELATED SELECTIONS

Installing WordStar for a printer involves choosing the specific printer type, communications protocol, and printer driver, as discussed in Section 2.

Selecting a Printer

The next "menu" displayed by INSTALL allows you to choose the type of printer which the installed WordStar will drive:

```
|----------------------------------------------------------------|
|                                                                |
|                  ***** PRINTER MENU *****                      |
|    (More specific info is displayed after choice is entered)   |
|                                                                |
|   A   Any "Teletype-like" printer (ie almost any printer)      |
|   C   "Teletype-like" printer that can BACKSPACE               |
|   D   DIABLO 1610/1620 daisy wheel printer                     |
|   E   DIABLO 1640/1650 daisy wheel printer                     |
|   F   QUME Sprint 5 daisy wheel printer                        |
|   G   NEC Spinwriter 5520/5520 thimble printer                 |
|   I   "Half-Line-Feed" Printers                                |
|   M   I/O MASTER / O.E.M Printer combination                   |
|   U   no change                                                |
|   Z   none of the above                                        |
|                                                                |
|   PLEASE ENTER SELECTION (1 LETTER): █                         |
|                                                                |
|                                                                |
|----------------------------------------------------------------|
```

If your printer is listed, enter the appropriate letter. If you don't see your
printer, type A, (or C if you know your printer can backspace). See Section 2
and Appendix D for futher discussion of the printer choices. INSTALL will then
display a message explaining any special considerations relating the printer
selection, then ask

     OK (Y/N):

If you wish to change your selection, type N, and the PRINTER menu question
will be redisplayed. To proceed to the next menu, type Y. Also, you may type
B to return to the beginning of the dialogue. The space bar may then be hit to
keep the prior answer to questions whose answer you do not wish to change.

The M selection on the above menu applies to all brands of "OEM" daisy wheel
and similar printers (NEC 5500D, Qume Sprint 5, Diablo Hy-Type II) when inter-
faced with the MicroPro "I/O Master" board. For further discussion of these
printers in combination with the "I/O Master" interface see Section 2, as well
as the message displayed when M is entered. Since no communications protocol
nor driver selection is necessary when installing WordStar to use an "OEM"
printer with the "I/O Master" interface, the next two menus are skipped when M
is selected.

If you chose M at the printer menu (above), proceed to the next subsection
("Bypassing the Patcher.")

Selecting a Communications Protocol

The next menu displayed permits choosing a "communications protocol", as dis-
cussed in Section 2.

```
┌─────────────────────────────────────────────────────────────────┐
│                                                                   │
│                                                                   │
│          ***** COMMUNICATIONS PROTOCOL MENU *****                 │
│                                                                   │
│   A "Communication Protocol" is necessary with some printers      │
│   to prevent printer buffer overflow and character loss.          │
│                                                                   │
│   E  EXT/ACK Protocol                                             │
│   X  "X-ON/X-OFF" Protocol                                        │
│   N  NONE required (or handled outside of WordStar)              │
│   U  no change                                                    │
│                                                                   │
│   PLEASE ENTER SELECTION (E, X, N, B, or U): ▮                    │
│                                                                   │
│                                                                   │
└─────────────────────────────────────────────────────────────────┘
```

As noted in Section 2, the appropriate answer is usually "None" except for
daisy wheel and similar printers interfaced at 1200 baud (120 characters per
second), for which the appropriate choice is usually "ETX/ACK". Enter the
desired letter. INSTALL will then display a message confirming the selection,
then ask OK (Y/N): as for the preceding menus.

Selecting a Printer Driver

The final printer-related menu permits choosing a printer driver:

```
┌─────────────────────────────────────────────────────────────────┐
│                                                                   │
│                                                                   │
│              ***** DRIVER MENU *****                              │
│                                                                   │
│   Or, how should WordStar send characters to your printer?        │
│                                                                   │
│   L  CP/M "List" device                                           │
│   P  Direct I/O to 8-bit port                                     │
│   S  User-installed driver subroutines                           │
│   U  no change                                                    │
│                                                                   │
│   PLEASE ENTER SELECTION (L, P, S, B, OR U): ▮                    │
│                                                                   │
│                                                                   │
└─────────────────────────────────────────────────────────────────┘
```

If "none" was specified for "Communications protocol", then "CP/M list output
device" is commonly the appropriate choice here. See Section 2 for further
discussion. Enter the desired letter. INSTALL will display a confirming
message and ask OK (Y/N): as after previous selections.

Port Driver

If you selected a printer driver other than P at the above menu, or if you
entered M at the printer menu, proceed to the next subsection ("Bypassing the
Patcher").

If you selected WordStar's port driver (P on the above menu), INSTALL will ask
additional questions to determine how to access your printer (see Section 4).

BYPASSING THE PATCHER

After the printer selections have been completed, INSTALL will display the prompt:

    ARE THE MODIFICATIONS TO WORDSTAR NOW COMPLETE?
      IF THEY ARE ANSWER YES TO THE NEXT QUESTION.
      IF YOU WISH TO MAKE ADDITIONAL PATCHES TO THE
      USER AREAS IN WORDSTAR ANSWER NO TO THE NEXT QUESTION.

    OK (Y/N):

For a normal installation, type Y. If you type N, the "patcher" will be activated. The patcher permits additional custom modifications, not usually needed when WordStar is first installed. Description of the patcher will be deferred to the end of this section.

                                 Note

    In the subsections that follow, you will learn how to repeat the
    installation dialog and how to re-INSTALL a previously INSTALLed
    WordStar (using the installation options). In either case, you can
    retain the previous selection by pressing the space bar (or RETURN)
    at the Printer Driver Menu. If the previous selection was P and you
    press the space bar, the additional questions for the port driver
    will not be reasked; the old answers will be kept. If you wish the
    port driver questions to be reasked, so that you may change one or
    more answers, type P at the Printer Driver Menu.

CONFIRMING OR CORRECTING YOUR SELECTIONS

All of the installation choices have now been presented. INSTALL will next display the terminal type, printer type, communications protocol, and printer driver that you have selected, then ask OK (Y/N): yet once more. If you wish to make any changes, type N or B, and INSTALL will return to the Terminal Menu, allowing you to repeat all of the selections. For those choices you do not wish to change, enter a space. INSTALL will keep the previous selection.

When everything is as you wish it, type a Y at this final confirmation. INSTALL will then automatically save the installed WordStar on a file named WS.COM, for future use, then start (pass control to) the installed WordStar, allowing immediate use.

The next two subsections describe the installation options and the patcher (not normally needed for initial installation). The various error messages that can occur during INSTALL are given in Appendix A.

INSTALLATION OPTIONS

As described above, the INSTALLprogram normally takes an uninstalled WordStar from file WSU.COM on the current drive, creates an installed WordStar on file WS.COM on the current drive, then executes the installed WordStar.

Occasions may arise when you wish to vary the above procedure. You might wish
to use different file names, or files on drives other than the current drive
for the final installed copy of WordStar or you might wish to start with a
previously installed WordStar in order to change one of the selections without
reentering them all.

INSTALL has provisions for operator entry of the file names to be used, and for
return to the operating system instead of starting the installed WordStar. To
use these options, invoke INSTALL, then type N at first question "Do you want
a normal first-time installation?". INSTALL will then display the INSTALLATION
OPTIONS menu as follows:

```
|---------------------------------------------------------------------------|
|                                                                           |
|           *****  WordStar INSTALLATION OPTIONS MENU  *****                 |
|                                                                           |
|  A   INSTALLation of a distributed WordStar, INSTALLing WSU.COM,           |
|      producing WS.COM, and then running the INSTALLed WordStar.            |
|                                                                           |
|  B   INSTALLation or re-INSTALLation of a WordStar COM file of             |
|      your choice, placing the newly INSTALLed WordStar in a file           |
|      of your choice, and then exiting to the operating system.            |
|                                                                           |
|  C   Same as B except run the INSTALLed WordStar.                          |
|                                                                           |
|  D   Modification of the INSTALLation of a WordStar COM file of            |
|      your choice.  The modified WordStar replaces the original            |
|      file.  The modified WordStar is then run.                            |
|                                                                           |
|  PLEASE ENTER SELECTION (A, B, C, or D): █                                 |
|                                                                           |
|---------------------------------------------------------------------------|
```

**Ordinary Install and Run
(Installation Option A)**

Selection A on the Installation Options menu corresponds to the normal case.
The dialog then proceeds as described above, as though you had entered Y to
the question "do you want a normal first-time installation?".

**Install to Another File and Exit
(Installation Option B)**

Selection B asks for two file names as follows:

  Filename of WordStar to be INSTALLed? █

    At this question, type in the name of the file from which INSTALL is to
    take the WordStar to be "customized" for your terminal and/or printer.
    Normally, this is file WSU.COM; you might want to enter "B:WSU" to get
    WSU.COM from drive B when the currently logged drive is A; or, you might
    want to enter the file name of a previously installed WordStar (e.g.,
    "WS") in order to change some of the installation selections without
    re-entering all of them.

Typing errors in the file name may be corrected by backspacing with con-
trol-H or rubout. Control-U may be used to erase the entire answer.
Terminate your answer with the RETURN key. If you omit the period and
file type, INSTALL will assume .COM. (If you press RETURN without
entering anything, INSTALL will assume WSU.COM).

If the file you specified was not found, INSTALL will respond

   THAT FILE DOES NOT EXIST

and repeat the question. Note that you must include the drive name
(letter followed by colon) at the beginning of the file name unless the
file is on the diskette in the current logged drive.

Filename for saving INSTALLed WordStar? ▮

At this question, type in the file name in which you wish INSTALL to save
the installed WordStar. "WS" is the normal answer to this question; you
might want to enter "B:WS" to save the WordStar on the diskette in the B:
drive; or you may prefer a file name other than "WS". (If you omit the
period and file type, INSTALL will assume .COM; if you press RETURN with-
out typing anything, INSTALL will write a file called "WS.COM" to the
current drive.)

After the two file names are accepted, the dialog under Option B proceeds as
described earlier in this section. After the final confirmation, INSTALL saves
the installed WordStar on a file of the specified name and then exits to the
operating system. Option B does not run the installed WordStar.

Install to Another File and Run
(Installation Option C)

Selection C on the Installation Options menu is the same as selection B -- file
names are requested as above -- except that after the installed WordStar is
saved on the disk, it is run. Option C is thus a convenience when immediate
use of the installed WordStar is desired.

Modify Another File and Run
(Installation Option D)

Selection D on the Installation Options menu combines the two questions of
selection B or C into a single question: one file name only is requested.
WordStar is read from this file, customized for your terminal or printer as you
specify during the dialog, then re-saved on a file of the same name. This
option is a convenience when you wish to modify the installation of a previous-
ly-installed WordStar -- for example, to change the printer type while keeping
the same terminal, or to change the communications protocol without changing
anything else.

When modifying the installation of a previously installed WordStar under
options B, C, or D, you may type U, or just press the space bar at any menu
whose selection you do not wish to change. INSTALL will respond by displaying
"Previous selection left unchanged:" and the previous terminal, printer, driver
selection, communications protocol, etc, and allow you to confirm this un-
changed selection by asking OK (Y/N): in the usual manner.

INSTALL'S PATCHER

INSTALL's patcher facilitates making special installations and modifications to WordStar. Installation of WordStar for terminals and printers not shown on INSTALL's menus, and other situations in which patching might be necessary or desirable, are discussed in Section 6 of this manual. If you wish to make such a special installation or modification, refer to Section 6, and to the listings in Appendices E and F, to determine exactly what patches to make. Once you have studied Section 6 and determined what bytes you wish to change in WordStar, INSTALL's patcher may be used to make the changes.

The patcher permits examining and/or changing any byte in WS.COM. The location of each byte to be changed may be specified by hexadecimal address or by label name taken from the USER1 or USER4 listing in Appendix E or F of this manual; the contents of each specified byte is displayed in hexadecimal and a new value may be entered in hexadecimal.

INSTALL's patcher is accessed by anwering N at the following prompt. As noted earlier in this section ("Bypassing the Patcher"), this prompt appears after the printer selections and before the final confirmation. (If you have already INSTALLed WordStar, and wish to make patches in the installed copy, you may use installation option B, C, or D and press the space bar to bypass the terminal and printer menus without re-entering those selections.)

        ARE THE MODIFICATIONS TO WORDSTAR NOW COMPLETE?
         IF THEY ARE ANSWER YES TO THE NEXT QUESTION.
         IF YOU WISH TO MAKE ADDITIONAL PATCHES TO THE
         USER AREAS IN WORDSTAR ANSWER NO TO THE NEXT QUESTION.

        OK (Y/N):

If you type N, a summary of the patching process will be displayed on your terminal, followed by the prompt:

        LOCATION TO BE CHANGED: █

Enter the desired address in hexadecimal, or enter the desired label (as shown in the USER1 or USER4 listing in Appendix E) followed by a colon. A label may be followed by a "+" and a hexadecimal number to access the location that many bytes after the label. Examples of valid answers:

        25B   (hexadecimal address)
        CTRAIL: (label)
        CTRAIL:+2   (label plus numeric offset)

INSTALL will then display the address in hexadecimal and the present contents of the indicated byte, and prompt you for the data you wish to replace it with. The screen line will appear as follows:

        ADDRESS: aaaaH   OLD VALUE: nnH   NEW VALUE: █

where aaa represents the hexadecimal address and nH represents the value that is presently occupying the byte at that memory address. Enter the hexadecimal value with which you wish to be replace the old value, or press RETURN only to make no change.

You will then be prompted to enter a new location. To access the next address, you may press RETURN only; to terminate patching, enter zero (type 0 and press RETURN).

By using symbolic labels, you can avoid absolute addresses, which change from release to release. Thus a patch made for one release of WordStar can easily be applied to a subsequent release without concern for changes in the location of the values which must be modified.

Section 4
Installation Procedure:
Port Driver

If you selected WordStar's port driver (P on the driver menu in Section 3), INSTALL will ask additional questions to determine how to access your printer.

Since the installation procedure for WordStar's built-in port driver is the most involved installation procedure, Section 4 is devoted exclusively to this subject.

I/O OR MEMORY-MAPPED

The first of the port driver questions requires you to specify whether your printer is connected to "I/O ports" or "Memory Mapped Ports". Determine this from the technical manuals for your computer; "I/O ports" are most common.

Are the printer ports I/O Ports or Memory Mapped (I or M): ▮

Enter either I for "I/O" or M for "Memory Mapped". Entering RETURN only will default to "I/O" for an initial installation, or to the previous selection if re-installing a WordStar.

The remaining questions determine the input and output data and status ports, and the status bits. If possible, find the necessary information in the technical manuals for your computer, and have INSTALL accept the information from you. However, if you cannot determine the port numbers or addresses to which your printer is connected or you cannot determine the status bits, INSTALL may be directed to attempt to determine the necessary information at each of the following steps.

The determine function may not succeed in correctly identifying the information in all cases (INSTALL may report failure if the information is not successfully determined, but could report success yet produce a WordStar that could not print). Further, INSTALL may lock up your computer system (requiring you to reboot) during its attempt to determine one of the following items. Determining the information yourself and directing INSTALL to accept the information from you is always preferable to having INSTALL attempt to determine the information.

OUTPUT DATA PORT

DO YOU WISH WORDSTAR TO DETERMINE THE VALUES OR SHOULD
WORDSTAR ACCEPT THEM FROM YOU (D OR A): D

*************** CAUTION *****************

THE FOLLOWING PROCEDURE WILL NOT WORK ON ALL HARDWARE AND
MAY HAVE UNUSUAL RESULTS SOMETIMES. PLEASE REMOVE YOUR
DISKS FROM THE DRIVES AND REPLACE THEM ONLY WHEN TOLD TO.

The next question allows you to specify whether you wish INSTALL to attempt to determine the output port to which your printer is connected, or you wish INSTALL to accept the port number or address from you:

WHAT IS THE OUTPUT PORT FOR YOUR PRINTER?

DO YOU WISH WORDSTAR TO DETERMINE THE VALUES OR SHOULD
WORDSTAR ACCEPT THEM FROM YOU   (D OR A): ▉

IN ORDER TO USE WORDSTAR'S AID TO DETERMINE THE OUTPUT PORT
THE PRINTER MUST BE CONNECTED AND TURNED ON, WITH PAPER FILLED.
A PRINT WHEEL AND A RIBBON MUST BE INSTALLED; THE COVER MUST BE
CLOSED. THE SERIAL PORT THAT THE PRINTER IS ATTACHED TO MUST
BE SET TO THE SAME BAUD RATE AS THE PRINTER.

On many **specialty printers** (NEC, DIABLO, etc.) not only do you have to have a ribbon in the printer, but you have to have enough to print (especially with the non-cycling carbon ribbons that can be used only once); otherwise, the printer will not be ready.

In addition you should note that if the baud rate is wrong, the printer will usually print jumbled information, as well as issue odd noises; this usually means that the port currently showing is the correct one, but that the **baud rate** is incorrect (meaning the **baud rate** set at the computer doesn't match the **baud rate** set at the printer).
Type A if you wish to enter the port number or D to have INSTALL help determine the port number. Pressing RETURN only will default to A. As noted above, A is preferable whenever you know or can find out the port number.

If you entered A, INSTALL will ask you for the port number:

What is the OUTPUT port number in HEX: ▉

Enter the value as a hexadecimal number, or press RETURN to keep a previously entered value. If you are not sure of the value, consult the technical manuals for your computer, or try letting INSTALL determine the value for you by answering D at the preceding question.

If you entered D, INSTALL will display a message prompting you to remove the diskette(s) from the disk drives. This is due to the fact that while testing ports to determine the printer output port, INSTALL may access a port used by the disk system. Please follow this instruction carefully. **REMOVE THE DISKETTES.** INSTALL will tell you when it is safe to re-insert them. INSTALL will also remind you that your printer must now be connected to the computer, turned on, and ready to operate. This is because INSTALL is about to try to print on it.

Next, INSTALL will start outputting characters to a port and display the following prompt:

    Now OUTPUTting to PORT #: nn Hex OK (Y/N): █

where nn represents the port number to which INSTALL is outputting characters. If your printer is idle, type N, and INSTALL will try the next port. Wait a few seconds and press N again if your printer is still idle. Keep pressing N until characters begin to print. When your printer starts printing, press Y — the correct port number has been found. (During the process of finding the printer output port, characters may appear on your terminal. Disregard the characters and press N to try the next port.)

OUTPUT STATUS PORT

Next, the output status port and bits (whereby WordStar can tell when the printer is ready to accept another character) must be determined. INSTALL will again ask whether to attempt to determine the information or allow you to enter it:

    WHAT IS THE OUTPUT STATUS PORT FOR YOUR PRINTER?

    DO YOU WISH WORDSTAR TO DETERMINE THE VALUES OR SHOULD
    WORDSTAR ACCEPT THEM FROM YOU   (D OR A): █

Again, use A whenever you know or can determine the information. If you type D, INSTALL will attempt to determine the port number and bits, and will display the results. Any "active" status port between the bottom of port addressing (00H) and the actual printer port may cause erroneous port assignment. This is so often the case that this "DETERMINE" function is not as useful as it might seem.

If you type A, INSTALL will ask the following three questions. If in doubt about the correct answers, study the technical manuals for your computer or try typing D instead of A.

    What is the OUTPUT STATUS port number in HEX: █

        Enter the port number in hexadecimal.

    What are the bit(s) that change at the OUTPUT STATUS port
    when the OUTPUT port becomes ready to accept a character
    for OUTPUT (enter HEX value): █

    Which bit(s) change(s) from a 0 to a 1 (enter HEX value): █

        Enter a hexadecimal number with 1 bits in the positions corresponding
        to status bits that are 1 when the printer is ready, and 0 bits for
        bits that must be 0 or are insignificant. Usually, the answer to
        this question is the same as the answer to the preceding question.

After these prompts from INSTALL have been answered, either via the DETERMINE function, with data from your technical manual or with "educated guesses", INSTALL will ask you to confirm your selections by displaying the following prompt:

> IF YOU WISH TO RETRY THIS OPERATION ANSWER "Y" TO THE "OK Y/N" QUESTION BELOW. YOU MAY ABORT INSTALLATION WITH A CONTROL C.
>
> OK (Y/N): Y

Answering 'N' rather than 'Y', as shown above, will cause INSTALL to return you to the beginning of the OUTPUT PORT installation sequence and you may correct or change any values which you feel are erroneous.

If you chose NO communications protocol, supplying a 'Y' response to this confirmation question will complete installation of the port driver—proceed to the next subsection ("Bypassing the Patching"). If you selected a protocol, INSTALL will ask a series of additional questions to permit inputting from as well as outputting to your printer.

INPUT DATA PORT

The DATA INPUT PORT is the port number (or mapped address) through which WordStar receives characters from the printer, as required when a protocol is in use. This port is frequently, but not always, the same as the output data port. We will not take a step-by-step approach to this set of prompts since they are nearly identical to those outlined above for the OUTPUT PORTS. INSTALL again asks whether to Determine or Accept the information, then asks for the port number (if you typed A) or displays the results of its determination (if you typed D).

Note that INSTALL will be able to determine the input port only if the connected printer is actually capable of and set up for the protocol selected for use by WordStar at the PROTOCOL MENU.

It is possible that INSTALL will report failure when attempting to DETERMINE the values and bits for this operation irrespective of the correct configuration of your printer and WordStar. In such cases it is possible to force the DETERMINE function to return correct values. If your printer has a keyboard, try typing characters on the printer keyboard while INSTALL is attempting to determine the input data port. If your printer does not have a keyboard and you have an extra terminal or keyboard available try substituting this in place of the printer temporarily. Now typing something at the keyboard while the DETERMINE function is operating may successfuly return the required port number and status bits. When this operation is complete you will, of course, want to replace the printer on the port.

INPUT STATUS PORT

Finally, the input status port and bits (whereby WordStar can tell whether a character has been received from the printer) must be determined. Again, INSTALL will ask whether to attempt to determine the information or to accept the information from you; the dialog and reservations are similar to those described above for the output status port.

Section 5
Testing WordStar

When WordStar is invoked--either as automatically occurs at termination of
INSTALLation, or when you type WS (or whatever file name your installed
WordStar is saved on)--WordStar should clear the screen and display a sign-on
showing the WordStar release and serial number and the terminal, printer,
protocol, and printer driver choices you made at installation.

After several seconds (or as soon as you press any key), the no-file menu plus
the names of the files on your diskette should display, like this:

```
              < < <   N O - F I L E   M E N U   > > >
* * * Preliminary Commands * *  * |* File  Commands *|* System Commands *
 L  Change logged disk drive      | P  Print  a file |R Run  a  program
 F  File directory     off (ON)   | E  Rename a file |X Exit to system
 H  Set help level                | O  Copy  a  file |
*  * Commands to Open a File *  *| Y  Delete a file |* WordStar Options *
   D  Open a  document file        |                  |M Run MailMerge
   N  Open a non-document file     |                  |S Run SpellStar █

DIRECTORY of disk A:
 CHAPTR1.DOC  CHAPTR1.BAK  CHAPTR2.DOC  CHAPTR2.BAK  CHAPTR3.DOC  CHAPTR3.BAK
 CONTENTS.DOC CONTENTS.BAK FILE1.DOC    FILE1.DOC    FILE2.DOC    FILE2.BAK
 LETTER.DOC   LETTER.BAK   TEXT1.DOC    TEXT1.BAK    TEXT2.DOC    TEXT2.BAK
 MAILMRGE.OVR WS.COM       WSMSGS.OVR   WSOVLY1.OVR
```

In the above diagram, the symbol █ represents the cursor position. If
highlighting is installed, the words displayed will be highlighted; if inverse
video highlighting is in use, inverse video boxes will be formed around the
menu and the phrase at the top of the screen.

TESTING CURSOR POSITIONING

If you get something like

```
 =  *  *  *  * Preliminary Commands *  *  *|* File  Commands *|*System Com
mands* = ‡ L  Change logged disk drive (now  A ) |  P  Print a file  |R Run  a
program = $ F  Turn file directory  off (now ON ) |  M  Run MailMerge  |  (STAT
to check  = %  H  Set help level (3,2,1,0) (now  3 ) |  S  Run  SpellStar  |
space on disk)  = & *  *  Commands to Open a File  *  *|  E  Rename a file
|X Exit to system = '          D  Open a  document  file      |  O  Copy  a file
|█     =       N  Open a non-document file      | Y  Delete a  file  |
 = + DIRECTORY of disk A:              CHAPTR1.DOC  CHAPTR1.BAK  CHAP
TR2.DOC   CHAPTR2.BAK   CHAPTR3.DOC   CHAPTR3.BAK  CONTENTS.DOC  CONTENTS.BAK
FILE1.DOC   FILE1.DOC   FILE2.DOC   FILE2.BAK  LETTER.DOC  LETTER.BAK   TEX
T1.DOC   TEXT1.BAK   TEXT2.DOC   TEXT2.BAK   MAILMRGE.OVR   WS.COM
WSMSGS.OVR  WSOVLY1.OVR
```

with the lines run together and random punctuation between lines, then the
cursor positioning control codes are not working. Check your terminal documen-
tation and the setting of all option switches on the terminal, and reinstall
WordStar or correct your terminal as required.

CHECKING FOR THE MESSAGE FILE

If you get

```
|              editing no file                          |
| @@@@ ▮                                                 |
|                                                       |
|  File WSMSGS.OVR not found.  Menus &                  |
|  messages will display as @@@@ only.                  |
|                                                       |
|                                                       |
|                                                       |
```

then the file WSMSGS.OVR, supplied on the distribution diskette, has not been copied to the diskette in use (or the diskette is neither in drive A nor in the logged drive). This file should always be on the diskette in drive A, or the diskette in the logged drive (or both), when WordStar is in use. Type an X to exit from WordStar and return to the operating system, copy WSMSGS.OVR to diskette in drive A (or the logged drive) (the command PIP is used to copy files in most CP/M operating systems), and invoke your installed WS again.

TESTING THE ERASE FUNCTION

Now (at the no-file menu, which should still be on the screen) type D. You should get:

```
| D            editing no file                          |
|                                                       |
|   Use this command to create a new document file,     |
|   or to initiate alteration of an existing document file. |
|                                                       |
|     A file name is 1 to 8 letters/digits, a period,   |
|     and an optional 1-3 character type.               |
|     File name may be preceded by disk drive letter A-D |
|     and colon, otherwise current logged disk is used. |
|                                                       |
| ^S=delete character    ^Y=delete entry    ^F=File directory |
| ^D=restore character   ^R=Restore entry   ^U=cancel command |
|                                                       |
|    NAME OF FILE TO EDIT? ▮                             |
|                                                       |
| DIRECTORY of disk A:                                  |
|  EXAMPLE.TXT  INSTALL.COM  PIP.COM     STAT.COM       |
|  WS.COM       WSU.COM      WSOVLY1.OVR  WSMSGS.OVR     |
```

If parts of the no-file menu (what was last on the screen) appear where there should be blank lines, then an erase to end line code is installed but not working.

CHECKING FOR THE OVERLAY FILE

If you get

   *** FATAL ERROR F46: Overlay File WSOVLY1.OVR Not Found

then the file WSOVLY1.OVR, supplied on the distribution diskette, has not been
copied to the diskette in use (or the diskette is neither in drive A nor in the
logged drive). Get WSOVLY1.OVR onto drive A (or the logged drive), and invoke
your installed WordStar again.

If the above screen displays correctly, press the RETURN key. The no-file menu
and directory should again be displayed, with the rest of the screen clear.

Type D to again obtain the last screen shown.   Answer the question NAME OF
FILE TO EDIT? by typing

        TEST.DOC

(or some other file name that is not in use on your diskette) and press RETURN.
The phrase

        NEW FILE

will be added to the screen display. After several seconds, the screen display
should change to the following:

```
   A:TEST.DOC  PAGE 1 LINE 1  COL 1              INSERT ON
                <<<        MAIN   MENU       >>>
 *  *  Cursor  Movement *  *|* Delete *| * Miscellaneous * | * Other  Menus *
^S char left  ^D char right |^G  char   |^I Tab    ^B Reform  | (from Main only)
^A word left  ^F word  right|DEL chr lf|^V Insert On or Off |^J Help  ^K Block
^E line  up   ^X line down  |^T word rt|^L Find/Replce again|^Q Quick ^P Print
 *  *   Scrolling    *   *|^Y  line   |RETURN End paragraph|^O Onscreen
^Z line up    ^W line down |          |^N  Insert a RETURN |
^C screen up  ^R screen down|          |^U  Stop a command  |
L----!----!----!----!----!----!----!----!----!----!----R
■                                                               .
                                                                .
                                                                .
                                                                .
                                                                .
                                                                .
                                                                .
                                                                .
```

TESTING THE EDITING FUNCTIONS

Type a few words. They should appear on the screen line below the "ruler" (the
line with the -'s and !'s); they should not be highlighted; the cursor should
move right as you type. If the cursor does not move, the "column" portion of
the cursor control codes is not functioning.

Type a ^J (^J on the screen menus and in this manual means to type control-J, that is, hold down the CTRL key on your keyboard and press J). After a second or two, a different menu should appear. The top line of the screen, the "ruler", and the words you typed, should remain. If portions of the previous menu remain to the right of the new, narrower one, then an erase to end line code is installed but not working. Press the space bar to return to the previous menu (the main menu).

Now type several lines of text. Gibberish is OK for our present purposes. WordStar will "wrap" the line for you if you type beyond the R end of the ruler without using the RETURN key; this is the normal operation of word wrap.

It should be possible to move the cursor around within the text you have entered, using ^E to move it up, ^D to move it right, ^S to move it left, and ^X to move it down. Try it. Recall that ^ means to hold down the CTRL key while typing the following letter.

Type a control-Y. The line of text containing the cursor should disappear, and the following lines move up. This tests the "delete line" control code, if one is installed. Type a control-N. A blank line should appear, with the lines below the cursor moving down. This tests the "insert line" control code, if one is installed.

ADDITIONAL TESTS FOR HIGHLIGHTING

Type a control-K. A different menu will appear. Type a B (or a b or ^B). The original menu will reappear, and "<B>" will appear at the cursor position. The <B> will be highlighted if you have installed highlighting. The characters on the line to the right of the cursor will move right three characters to make room for the <B>. Move the cursor forward a few characters (^D) or down a line or two (^X), and type ^K twice. The menu may not change, depending how soon you type the second ^K.

If no highlighting is installed, <K> will appear at the cursor position. If high-lighting is installed, the characters from the position of the <B> to the posi-tion where ^KK was typed should highlight - display in inverse video, or dimmer or brighter than the rest of the screen. The <B> should disappear. (What you have just done is "marked" a "block" of text, as in preparation for a block move or block copy command.) If the <B> disappears but the characters do not highlight, then inoperative highlighting control codes are installed.

Check the codes and reinstall if necessary; if they can't be made to work, remove them so the <B> and <K> will display. Another possibility (if you are using bright/dim highlighting) is that the contrast or brightness on your terminal are set such that bright and dim characters are indistinguishable.

Now type ^K. A new menu will appear. Type a D (or d or ^D). The message

SAVING FILE A:TEST.DOC

should appear. This saves the entered text on the disk, so that you can try printing it. Whenever text is entered or updated with WordStar, it is neces-sary to save it in order to keep it permanently, or to print it. After the save is complete (a few seconds), the no-file menu should reappear, as shown above.

TESTING THE PRINTER

To test the printer installation, type a P at the no-file menu. WordStar will ask you for the name of the file to print; enter TEST.DOC or whatever you called the file. Press the RETURN key. Several more questions will be asked; just press RETURN at each one for now. When Ready printer, press RETURN appears, make sure your printer is turned on and on-line (whatever your particular printer needs to be ready for use), then press any key. The text you entered should be printed, then the paper should feed to the bottom of the page and a "1" (page number 1) should be printed.

You may now delete (erase) the test file you entered, by typing a Y and answering the question NAME OF FILE TO DELETE? by entering TEST.DOC (or whatever you called your file) and pressing RETURN.

To return to the operating system, type an X at the no-file menu. The system prompt A> will appear at the bottom of the screen.

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Section 6
Custom Terminal Installation

MODIFICATION BY PATCHING

General Description

Modification by patching is used in installing WordStar for terminals not included in the installation menus (Section 3) and for printers that require special control strings or modifications to one of WordStar's printer drivers, and for achieving refinements in installation, such as supporting special features of specific non-daisy printers, circumventing the "DELETE-backspace feature" of certain operating systems, or enabling display in the last column of the last line of the screen.

Since basic installation is achieved with the INSTALL program as described in Sections 2-5, most users should not need to patch.

"Patching" means modifying WordStar by changing the contents of bytes in WS.COM. Patching may be accomplished with INSTALL's patcher (as described in Section 3) or with your debugger (DDT in most systems) or with your computer's front panel switches. Sections 6, 7, and 8 of this manual are primarily for those who already understand patching.

Listings in Appendix

Appendices E and F contain absolute assembly listings of two user-patchable portions of WordStar, USER1 and USER4:

o   USER1 is the module containing all terminal-installation related patch areas;

o   USER4 contains all printer-related patch items for non-daisy printers, plus many used for both daisy and non-daisy printers.

The listings are commented heavily; read them for a detailed description of each item. The following paragraphs give general description of the modules, and hit a few high points of the details, but do not attempt to duplicate the detailed information contained in the program comments. Note that the addresses provided in these listings are correct for the revision of WordStar specified on the listing and not necessarily for any other. Where LABELS: can be used, independence from revision-dependent locations is provided and is therefore desirable.

MODIFYING THE TERMINAL PATCH AREA

Modification of the terminal patch area is used for these purposes:

o   to install WordStar for a terminal or video board not provided for in the INSTALL program

o   to achieve a different installation for a terminal that is on the menu (e.g., to reverse the sense of bright/dim highlighting to suit individual preference)

o to achieve refinements in installation, such as permitting display in the
   last character position of the last line of the screen or disabling some
   operating systems' backspace-on-rubout "feature" that interferes with
   WordStar's screen updating

o to drive a terminal device which is not accessible via the operating
   system.

Installation for a Terminal
Not Shown on Terminal Menu

WordStar can be installed for most terminals by determining the terminal's
control codes as discussed in this section, then making patches as discussed
later in this section ("Terminal Patch Area"). Unusual installations, such as
direct storage access to a video board, or use of a terminal which cannot be
accessed via the operating system, are described in the next subsection ("Video
Boards and Custom Terminal Drivers").

TERMINAL REQUIREMENTS AND OPTIONS

To be used with WordStar, the terminal must have a screen at least 16 (and not
more than 120) lines high by at least 40 columns wide, and have the capability
to place the cursor at any position on the screen upon receipt of a suitable
control sequence from the computer.

Desirable, but not essential, additional terminal features include line insert,
line delete, and/or erase to end line -- these may speed screen redisplay
during editing -- and inverse video, bright/dim, or some other form of charac-
ter-by-character highlighting -- highlighting allows WordStar to differentiate
the menus and questions from the text of the document being edited, and to
highlight the "marked block" of text that is to be moved or deleted.

DETERMINING CONTROL CODES

The first step in installing WordStar for a terminal not on the menu is to
study the terminal manufacturer's manual to determine the screen size and the
control codes which WordStar must transmit to the terminal to accomplish the
various functions. Additional discussion of each required and optional
function follows; patching the codes into WordStar is covered later in this
section ("Terminal Patch Area").

CURSOR-POSITIONING CONTROL CODES

Positioning the cursor is the most complex terminal function used by WordStar,
since it involves transmitting the row and column at which the cursor is to be
placed. The form of the control string sent to the terminal to position the
cursor varies widely from terminal to terminal; WordStar's cursor-positioning
patch items are designed to accommodate almost all commonly used forms. For
these reasons, it is necessary to analyze your terminal's cursor-positioning
sequence to derive the information needed to patch WordStar.

Some terminals have a single control sequence to position the cursor at a line
(row) and column (character) number; others have separate control sequences to
position the cursor on a line and at a column; either will work with WordStar.
In the former case, the terminal may require either the row or column trans-
mitted first. For some terminals, the line and column numbers are sent with no

offset, that is, a zero is sent for the top line on the screen (or left column), a one for the next line down (next column over), etc. For others, an "offset" is added.

For example, several terminals require 20 (hexadecimal) for the top line or left column, 21 for the second line (or column), etc. For most terminals, the row and column are sent in binary, with a single byte (character) transmitted for each; for a few terminals, the row and column are each sent as a two- or three-digit ASCII number, with a character (ASCII "0" through "9") transmitted for each digit.

Analyze the cursor positioning codes for your terminal, as described in the terminal manufacturer's manual, and determine:

1. Number of characters and character values that must be sent before either the line or column is transmitted.

2. Whether the row or column is transmitted first.

3. Number of characters and character values that must be sent after the row (or column, whichever is sent first), and before the other dimension is sent. For many terminals, this is no characters.

4. Number and values of characters to send after both row and column, if any—usually none.

5. Offset to add to row number—usually zero or 20 hex.

6. Offset to add to column number—usually same as for row.

7. Whether row and column are sent as single-byte binary value (the usual case), or multi-character ASCII number. If ASCII, determine the number of digits—ususally two or three.

Cursor Control Code Example A

Terminal requires, in order, 1B hex, 3D hex, line number plus 20 hex, column number plus 20 hex, to set cursor position. The answers to the above questions are as follows:

1. 2, 1B, 3D
2. Row is first
3. None
4. None
5. 20 hex
6. 20 hex
7. Binary

Cursor Control Code Example B

Terminal requires 1B hex, 01 hex, line number to set cursor to line, and 1B hex, 02 hex, column number to set cursor to column. The above questions may be answered as follows:

1. 2, 1B, Ø1
2. Row is first
3. 2, 1B, Ø2
4. None.
5. Ø
6. Ø
7. Binary

Cursor Control Code Example C

To position cursor, terminal requires, in order, 1B hex, 43 hex, column as 3-character ASCII number (with leading zeroes), row as 3-character ASCII number. The answers to the above questions are:

1. 2, 1B, 43
2. Column is first
3. None
4. None
5. Ø
6. Ø
7. 3-digit ASCII

The answers to the above questions provide the information necessary to patch WordStar for your terminal's cursor positioning control codes; application of this information is covered later in this section ("Terminal Patch Area").

If you have an extremely unusual terminal, you may find that it is not possible to analyze its required cursor positioning commands into answers to the above seven questions. For such cases, you must write (or have a programmer write) a subroutine to generate the necessary cursor positioning command sequence; installation of this subroutine is covered below ("Terminal Patch Area").

HIGHLIGHTING (OPTIONAL)

We also recommend determining the codes to invoke highlighting, if available, by inverse video display, bright/dim display, or some other method. If both bright/dim and character-by-character inverse video are available, we suggest inverse video, as it will highlight blanks as well as other characters, and stands out strongly. The highlighting method must operate on a character-by-character basis, take no screen positions, and not be tied to field protection.

Determine the code or code sequence to turn highlighting on, and the sequence to turn highlighting off. The "Highlighting on" sequence should cause subsequently transmitted characters to be highlighted until a "Highlighting off" sequence is transmitted. WordStar always turns highlighting off before transmitting a carriage return, line feed, or cursor positioning sequence; therefore, it does not matter whether or not these functions cancel highlighting on your terminal.

ERASE TO END OF LINE (OPTIONAL)

This function blanks all character positions from the cursor position to the end of the current screen line.

DELETE LINE (OPTIONAL)

This function should delete the entire screen line containing the cursor, moving the following screen lines up one line.

INSERT LINE (OPTIONAL)

This function should insert a blank line on the screen at the line containing the cursor, moving the cursor line and following lines down one line. If your terminal inserts below the cursor line, put a "cursor up" code at the beginning of the "insert line" string patched into WordStar.

After determining your terminal's control codes, proceed to "Terminal Patch Area" later in this section.

Video Boards and Custom Terminal Drivers

WordStar normally accesses the terminal by inputting and outputting characters via the operating system (direct jumps to the "BIOS" entry points are used). However, two variations are also supported: direct storage into a memory-mapped video board for output, and custom user-supplied subroutines for input, status, and/or output. These variations are of interest only to users with unusual installation requirements; most readers may skip directly to "Terminal Patch Area" later in this section.

DIRECT STORAGE TO A VIDEO BOARD

A memory mapped video board accessible (including cursor positioning) through the operating system character output calls may be installed as any other terminal is installed; you may proceed as described in this section ("Installation for a Terminal Not Shown on Terminal Menu" and "Terminal Patch Area").

However, WordStar can access memory-mapped video display boards meeting certain restrictions by storing directly into the video memory area. Such direct storage results in superior performance: extremely fast screen update, use of all character positions including last column of last line, and line insertion, line deletion, and erase to end line without the need of control codes for these functions. Further, direct-storage access to a video board makes about 2K more memory available for the file being edited.

The memory-mapped video board requirements for direct-storage access are as follows:

   o   Each character position must appear as a location in memory, contigu-
       ously from a starting address. The first line must begin at the
       starting address, the second line must immediately follow the first,
       etc. The lines must always be full length; WordStar will blank-fill
       them as required.

   o   Highlighting, if used, must be invoked by setting the high order bit
       of each character to be highlighted. WordStar cannot invoke high-
       lighting in any other manner while storing directly into a video
       board.

When accessing a memory-mapped video board on a direct storage basis, WordStar can position the cursor either with the control code sequence or user-installed

subroutine (as for a terminal), or by setting the high order bit in memory of the character under the cursor. Highlighting can be produced by setting the high order bit; this produces inverse video on many boards. If the high order bit is used both for highlighting and for cursor display, WordStar can blink the cursor to make it stand out when it is on or adjacent to highlighted text.

Even if cursor display is by high-order bit, a cursor position code sequence or subroutine should be installed, as WordStar uses it to position the cursor at the bottom of the screen at exit, and to initially get its cursor and the externally known cursor in the same place.

To Install WordStar to access a memory-mapped video board meeting the restrictions described above on a direct-storage basis, patch locations MEMAPV, MEMADR, HIBIV, HIBCUR, and CRBLIV as explained in the associated comments. Note that the cursor positioning items as used for a terminal should always be patched even if HIBCUR is non-zero. Note also that there is a page of comments near the end of the listing giving installation suggestions for video boards which do not meet the requirements for direct-storage access and which cannot conveniently be accessed via the operating system. Use items SWIN and SWOUT if it is necessary to switch the board into the address space before access and switch it out after access.

For video boards that are not always addressable, WordStar can switch the board into the address space before storing into it and switch it out after each access, provided the board occupies addresses above about 8000 hex when "switched in".

Custom installation for direct-storage access to a memory-mapped video board is accomplished by patching; proceed to "Terminal Patch Area."

CUSTOM CONSOLE DRIVER SUBROUTINES

Custom subroutines may be installed by the user for console input, console status (character ready), and/or console output. Such routines may be used to access a terminal device not accessible through the operating system and which is not a memory-mapped video board meeting the requirements given above for direct-storage access. For example, a memory-mapped video board with non-contiguous lines or variable-length lines (disallowing direct-storage access) and no cursor positioning control codes (disallowing access through the operating system) might be driven via a custom console output subroutine which could interpret control codes as required. The patch locations and calling sequences for these routines are given in the USER1 listing in Appendix E, as discussed below ("Terminal Patch Area").

TERMINAL PATCH AREA

All patch items relating to terminal I/O and terminal control codes are in program module USER1, as listed in Appendix E. Many are set by the INSTALL program (thus, INSTALL should be run before, not after, patching, if you patch with DDT). Additional items can be changed only by patching. Each item is identified and explained in detail by comments in the listing; the following discussion corresponds approximately to the order of items in the listing.

Note that all character strings to be sent to the terminal (erase to end line, etc.) have the number of characters to be sent in the first byte, and the characters to send in following bytes.

Terminal Installation

An earlier subsection ("Installation for a Terminal Not Shown on Terminal Menu") discussed requirements and information to be obtained from the terminal manufacturer's manual before making a custom terminal installation; read that section first if you have not already read it. The locations into which to patch terminal-related items are clearly identified by comments in the USER1 listing. The first two items in the listing are the locations into which to patch the screen height and width; following these are locations for cursor control string specification as analyzed per the seven questions given earlier in this section.

There is provision (item UCRPOS) for cursor positioning by an alternate method, calling a subroutine written and "patched in" by the user. The calling sequence for this subroutine is detailed in the comments; the information the subroutine receives includes the row, column, number of character positions from beginning of screen to cursor position, and number of character positions from beginning of screen to beginning of screen line containing cursor.

Space for the optional erase to end line, delete line, insert line, highlighting on, and highlighting off strings is given.   Spaces for strings to be sent to the terminal at startup and at exit are provided, to allow special initialization or mode selection and deselection; there are also provisions for user-supplied subroutines which are called at startup and at exit.

Displaying in the Last Column
of the Last Line (USELST)

A flag, USELST, is provided in USER1 which may be patched non-zero to enable display in the rightmost column of the last line of the screen, making the "flag" character for this line display.

WordStar does not normally display in the rightmost column of the last line of the screen (except when using direct memory access to a video board), because many terminals automatically carriage return after display in the last column of a line, scrolling the screen up a line if it was the line at the bottom of the screen. For some terminals, scrolling after display in the last character position on the screen can be disabled via an option switch (possibly called "AUTO RETURN") inside the terminal; for others, such scrolling can be disabled via a mode selected with a control character string sent from the computer.

If you have a terminal which does not scroll after display in the last character position, or has been configured thus, patch USELST in USER1 (see listing in Appendix for address) non-zero to see the "flag" on the last file line displayed. If a mode which does not scroll after display in the last character position can be selected by a control sequence sent from the computer, the initialization string TRMINI may be used; the exit string TRMUNI may then be used to restore the normal mode for convenience when using other programs after exiting from WordStar. Note: it doesn't matter where the cursor goes—nowhere, or back to "home"—after displaying in the last character position, so long as the screen does not scroll up a line.

Patchable Function Delays (DELCUS and DELMIS)

Patchable function delays, DELCUS and DELMIS, are provided for use after the terminal functions indicated in the listing. These are present because many terminals lose characters if character output occurs too soon after cursor positioning or other functions. The default values are sufficient for most terminals; INSTALL increases and decreases them as necessary for certain terminals on the menu. For custom installations, you may need to patch longer or shorter delays as explained in the comments.

Usually it is best to get these delays to work before implementing any of the "unnecessary functions" (functions other than ABSOLUTE CURSOR POSITIONING and SCREEN HEIGHT and WIDTH). Get the terminal to work reliably (meaning character's don't disappear and meaningless characters don't appear) by increasing the DELAYS. Start by varying DELAY AFTER CURSOR SET (DELCUS:). Try increments of 10 hex bytes until the terminal stops being erratic. This will get all the spurious characters problems about 80 per cent of the time. Those problems left over can usually be "fine-tuned" away by varying DELMIS: using the same approach outlined for DELCUS:.

Once the "grossest" gross values for DELMIS: and DELCUS: have been determined, reduce DELCUS: until the problems just start to reappear. Next raise this delay 6 or 7 increments. Do the same thing for DELMIS:.

Next, install the highlighting functions (if available). This can often require that the DELAYS (either one or both) be increased several times the value required without highlighting them. Sometimes the terminal becomes so slow before highlighting will work properly that the user will have to decide whether or not highlighting is worthwhile.

Finally install ERASE-TO-END-OF-LINE, INSERT-LINE and DELETE-LINE FUNCTIONS. These are supposed to speed things up. Sometimes they do and sometimes they slow things down (i.e., DELCUS and/or DELMIS have to be increased to get the display acceptable when any one or combination of these functions are installed).

As a rule of thumb, use only those which speed up operation. If any one of the special functions slows things down, do not install it (them) and let the software do that function instead.

If any of these functions or combination of these functions resulted in a significant increase (10 or more decrements of DELMIS:, 20 or more decrements of DELCUS:), it may be time to try the HIGHLIGHTING FUNCTIONS again (assuming they slowed things down and they were left outg in the previous step). Sometimes, when these functions actually do speed things up they can have a profound effect on the operation of the HIGHLIGHTING functions.

Note that "sufficient" may mean acceptable to the general user, but tweaking for maximum performance is the **American way** and is more often than not possible and effective.

Circumventing the System's
DELETE-Backspace "Feature"

BACKGROUND

When a command is being entered to the operating system and the DELETE (RUBOUT)
key is used to erase the last character entered, standard CP/M echoes the
character erased. A number of manufacturer's and distributors variants of CP/M
1.4 have a modification added in the I/O patch section of the system ("BIOS")
to cause the DELETE key to erase the character on the screen instead of echo
another copy of the character erased. This modification works by outputting
"backspace, space, backspace" in place of the next character output after a
DELETE is input.

While a convenience in entering normal system commands, this feature interferes
with WordStar operation: the next character output by WordStar after a DELETE
is input is normally the beginning of a cursor positioning sequence, and if it
is not transmitted without modification, the results on the screen are disas-
trous. Hence, there are provisions in USER1 for disabling the DELETE-backspace
"feature".

SYMPTOMS

If your operating system erases characters on the screen, rather than echoing
characters, when you use the DELETE key while inputting a system command, AND
if the screen line containing the cursor is not correctly updated when you use
the DELETE key while editing with WordStar, or the cursor is misplaced after
use of the DELETE key, then your system has the DELETE-backspace "feature" and
this "feature" must be disabled for correct screen updating in WordStar.

Examine the code of the BIOS (I/O patch) section of your system (listings of
this portion of the system are normally supplied, or available on request, or
you may poke around with your debugger without a listing) to determine how your
DELETE backspace "feature" works, and apply one of the following methods to
disable it.

Zeroed After Character Input (ZAFCIN)

Many DELETE-backspace implementations set a flag when a DELETE is input, or
just store the last character input, in a fixed memory location, then substi-
tute "backspace, space, backspace" for the next character output after a DELETE
is input. Such implementations can be disabled when WordStar is running by
patching the address of this location into USER1 at ZAFCIN: if ZAFCIN is non-
zero, the location it points to is Zeroed AFter Character INput by WordStar.
For example, S. D. Sales and Digital Microsystems' versions of CP/M, among
others, store the last character input in location 4F hex. Patching ZAFCIN to
4F prevents the DELETE-backspace feature in these systems from interfering with
WordStar's screen updating after the DELETE key is used.

Rubout Fix Locations
(RUBFXF and RFIXER)

These USER1 locations may effect a partial fix to the DELETE-backspace problem
in cases where ZAFCIN cannot be effectively applied. If RUBFXF (RUBout FiX
Flag) is patched non-zero, then the contents of RFIXER is output immediately
after a DELETE is input. Put a relatively harmless character in RFIXER – try

null (00 hex), backspace (08 hex), or space (20 hex). When this character is
output, your system will replace it with "backspace, space, backspace"; this
will have less deleterious effect than changing the beginning of a subsequent
cursor positioning string to "backspace, space, backspace". The results will
probably be a single blanked screen position, instead of an entire messed up
line and a misplaced cursor.

Custom Console Driver Routines

Items UCNSTA, UCONI, and UCONO allow installation of custom terminal I/O rou-
tines to be used in lieu of calls to the operating system's "BIOS" entry
points.

To facilitate special video board installation, the custom terminal output
routine (UCONO, as detailed in the listing comments) receives the following
information: character to be displayed (with high order bit on for highlighting
if HIBIV is patched non-zero), row, column, number of character positions from
beginning of screen to cursor position, and number of character positions from
beginning of screen to beginning of screen line containing cursor.

Note that **the custom terminal character input routine (UCONI) may be called
whether or not the status routine (UCNSTA) has already indicated that a
character is available, despite a comment to the contrary in a prior release
USER1 listing.** Thus, your UCONI routine must include code to wait if necessary
for a keystroke.

Delays

Items DEL1 through DEL4 allow control over the delay times used within WordStar
to blink the cursor, hold the sign-on on the screen, etc. You may wish to vary
these to accomodate your CPU speed or to suit your preference.

Note

> Near the top of page 15 (Appendix E) are three special flags, TRSCRS,
> TRSCIF, and HETHBS. These do nothing in normal WordStar; they are
> active only in special versions, and are appropriately set by the
> INSTALL program supplied with those versions.

Patch Space for Added Subroutines

Items UCRPOS, INISUB, UNISUB, and others allow for a user-added subroutine;
however, space is provided at these items for a JMP instruction only. There is
space for a considerable amount of code at MORPAT, on the last page of the
USER1 listing. If more space is needed, go to the free memory area, as pointed
to by the **actual** contents (examine with DDT) of PBGMEM at the end of USER1. If
you make additions there, be sure to patch PBGMEM to point beyond your addi-
tions, and be sure to determine and use the necessary SAVE command size — note
that there are several thousand bytes between the normal end of the .COM file
and address contained in PBGMEM.

Patches in this area must be made with your debugger (DDT); INSTALL's patcher
will not correctly make patches in this area. Also, if you operate on your
WordStar with the INSTALL program after adding code at the end, you will need
to redo your additions — INSTALL will delete any code beyond the normal end of
WordStar.

Testing Your Terminal Installation

Review Section 5 ("Testing WordStar"). That section shows various correct and
incorrect screen displays, and gives likely causes of the incorrect displays.
The tests given there will help you determine whether your installation is
functioning correctly, and, if not, which patch item is most likely at fault.

The Page Intentionally Left Blank

Section 7
Custom Printer Installation

Modifications in the printer patch area are used to support optional printer
features, to install unusual printers which are similar to, but not exactly,
"Teletype-like", and to support communications protocols including specif-
ication of ETX/ACK message length. Modifications in the printer patch area are
also used to handle unusual installation requirements with regard to the
transmission of characters from (as required by communications protocols,
Section 2) and to the printer.

This manual does not cover patching to support the features of daisy-wheel
printers. The INSTALL program performs complete installation to support all
available features of the common daisy wheel and similar printers (including
NEC 5500-series, Diablo, and Qume printers). Patching for such printers is
extremely complex due to the interaction of many features and the requirements
of bidirectional printing, variable character width, and variable line height.
By purchasing **Customization Notes**, you can proceed with such patching.
However, all aspects of transmission of characters to and from serial daisy
wheel and similar printers are accessible and documented in this section.

The assembly listing of module USER4 in Appendix F shows all modifiable items
relating to Teletype-like and other non-daisy printers, and all modifiable
items relating to transmission of characters to and from Teletype-like printers
and serial daisy wheel and similar printers.

The rest of this section will follow the approximate order of items in the
USER4 listing, to facilitate relation of the text to the listing. Users making
an installation requiring a communications protocol (Section 2) will probably
be first interested in the printer driver patch items; these are described
later in this section ("Printer Drivers").

PRINTER TYPE AND RELATED ITEMS

Printer Overstrike Method (POSMTH)

POSMTH determines how overprinting, as required for boldface, double strike,
underline, backspace, etc. is acheived.

If POSMTH contains FF hex (as set by INSTALL when "Any Teletype-Like Printer"
is selected), WordStar will overprint by sending a carriage return code (see
item PSCR) followed by another complete line, containing spaces in columns not
to be overprinted. Several overprint lines for the same document line will be
sent if necessitated by the use of multiple enhancements or boldface.

If POSMTH contains zero (as set by INSTALL when "Teletype-like Printer That Can
Backspace" is selected), WordStar will overprint by backspacing (see item
PBACKS in the next subsection) then sending the character to be overstruck as
each character position requiring multiple strikes is encountered. POSMTH=0
produces faster printing than POSMTH=FF for printers that can backspace; also,
POSMTH=0 will allow printing underline, boldface, backspace, etc. on printers
that can backspace but cannot return the carriage without line feeding.

If any daisy wheel or similar printer is selected in **INSTALL**, POSMTH will be
set to 1 and should not be altered.

Bold-Strike (BLDSTR)

BLDSTR contains the number of strikes of each character used for the "boldface"
print enhancement. For Teletype-like printers, it may be increased or de-
creased to yield darker or lighter boldface; for daisy wheel and similar
printers it should not be altered.

Double-Strike (DBLSTR)

DBLSTR contains the number of strikes (normally 2) used for the "double strike"
print enhancement; it may be increased for darker "double strike" or reduced to
1 for no double strike, on any printer type.

PRINTER FUNCTION STRINGS

Patchable strings for a number of mandatory and optional printer functions are
provided. Each string consists of the number of characters, followed by the
character values. When altering a string, make sure you set the number of
characters correctly. The optional string items should have a zero "number of
characters" if the optional function is not installed.

Advance to the Next Line (PSCRLF—
Print String: Carriage Return, Line Feed)

This is the character string, normally "carriage return, line feed," sent to
advance a non-daisy printer to the beginning of the next line. The characters
in the string may be altered as required by unusual printers; the count may be
increased to send nulls (zeroes) (up to a total of 10 characters) after the
character string is sent if the printer requires a delay while the carriage
returns and the paper advances.

Return to the Start of the Same Line
(PSCR—Print String: Carriage Return)

This is the character string, normally carriage return only, used to return the
carriage of a non-daisy printer to the beginning of the same line. This string
is used to permit overprinting for underline, boldface, etc. if POSMTH (above)
is FF hex; it is also used whenever a carriage return without a line feed is
encountered in the document, if POSMTH is FF or 0 (see "Overprint Lines" in the
Reference Manual).

Non-Daisy Backspace (PBACKS)

This is the character string, normally an ASCII "backspace" character, used to
backspace a non-daisy printer. This string is transmitted if POSMTH (above) is
zero in order to permit printing a character in the same position as the
preceding character for underline, boldface, backspace, etc. Note that if
POSMTH is not zero this string is never transmitted and thus the printer need
not be capable of backspacing.

Non-Daisy Half-Line Advance
(PSHALF—Optional)

This is a character string to return the carriage and advance the paper one-half line, for non-daisy printers with this capability but without the capability of advancing the paper backwards a fractional line (see also ROLUP and ROLDOW below). If installed, the half-line advance will be used to print subscripts and superscripts one-half line below or above, respectively, the rest of the line.

Example: If the printer advances one-half line for each line feed code sent, install the sequence "carriage return, line feed" at PSHALF and the sequence "carriage return, line feed, line feed" or "carriage return, line feed, carriage return, line feed" at PSCRLF.

Note

The INSTALL Printer Menu selection "Half-Line-Feed Printers" sets PSHALF and PSCRLF to the foregoing strings; this selection is otherwise identical to the selection "Teletype-Like Printer that can BACKSPACE".

Non-Daisy Roll UP (ROLUP—Optional)

This is a character string to roll the carriage UP (move the paper down) a fractional line, for non-daisy printers with this capability. If ROLUP and ROLDOW are installed, subscripts and superscripts will be printed by moving the carriage up and down in the course of printing a line.

Non-Daisy Roll Down (ROLDOW—Optional)

If ROLUP (preceding) is installed, then the string to roll the carriage down (paper up) a fractional line should be installed at ROLDOW.

Non-Daisy Alternate Pitch (PALT—Optional)

A string may be installed here to set the printer to an alternate character pitch (character width), for non-daisy printers with this capability. An alternate pitch print control (^A; **Reference Manual**) in the document will then invoke transmission of this string.

Note

WordStar contains the necessary logic to restore normal pitch while printing page offsets, headings, etc. that were specified when normal pitch was in effect.

Non-Daisy Standard Pitch (PSTD—Optional)

If PALT (preceding) is installed, then the string to restore the printer to its normal character pitch should be installed at PSTD.

Special Functions (USR1 through USR4—Optional)

These strings may be installed to invoke otherwise unsupported special functions of your printer (e.g. changing character fonts or activating a sheet

feeder) in response to the User Printer Function print control characters (^Q, ^W, ^E, and ^R, **Reference Manual**) imbedded in your document. For character pitch changes, PALT and PSTD should be used in preference to USR1 through USR4. If you have a daisy printer, USR1 through USR4 control strings should be installed with great caution, and tested thoroughly, as complex interactions with WordStar's operation of the printer are likely to occur despite the fact that WordStar always prints forward when printing a line containing a user printer function control. For some printers, INSTALL may define one or more of these controls; check Appendix D with regard to your printer.

Non-Daisy Ribbon Color
(RIBBON and RIBOFF—Optional)

These strings may be installed by the user to allow selection of alternate ribbon color with the ^Y print control (**Reference Manual**) on non-daisy printers with this capability; for daisy wheel and similar printers, RIBBON and RIBOFF are set appropriately by INSTALL.

Non-Daisy Initilization String
(PSINIT—Optional)

This is a string transmitted to the printer at the start of printing. For non-daisy printers, you may add any desired controls, (e.g., to turn the motor on or select a line spacing or character pitch). INSTALL puts a carriage return in this item; add your bytes and increase the count appropriately. For daisy printers, this item is appropriately set by INSTALL and should not be altered.

Non-Daisy Finish String
(PSFINI—Optional)

Similar to PSINIT, this string is sent at the conclusion of printing.

Initialization and Finish Subroutines
PRINIT and PRFINI—Optional)

These are subroutines called at the beginning and end of printing, respectively; they may be used to perform printer assignment or special initialization functions that cannot be performed by transmitting a character string. Space is provided for a JMP only; for finding space to put your subroutine, see "Terminal Patch Area," Section 6.

PRINTER DRIVERS

Printer Driver Flags

PRINTER DRIVER FLAG (CSWTCH)

Value determines which of the printer drivers (see next subsection) is used to transmit characters to (and possibly from) the printer:

    0: CP/M "List Output" Device
    1: WordStar's Port Driver
    2: User-installed Printer Driver Subroutines
    3: OEM Daisy Wheel and Similar Printer Driver
    4: Alternate Console Printer Driver

CSWTCH applies to all printers. CSWTCH is set by INSTALL in accordance with the choice made at the "Printer Driver" menu.

Printer Busy Test Flag (HAVBSY)

HAVBSY should be set to

- o   non-zero if the printer driver in use has a "printer busy test" implemented

- o   zero if no provision has been installed for determining when the printer is ready to accept a character.

When non-zero, WordStar will not output to the printer until the printer is ready, and WordStar will check more often whether the printer is ready to accept a character. Thus, a correctly installed printer busy test, plus a non-zero value in HAVBSY, cause the printer to run more steadily when editing is being performed at the same time as printing, while improving keyboard response in editing because the printer output routine will never "hang" while waiting for the printer to be ready to accept a character.

INSTALL sets HAVBSY non-zero if the port driver is selected, or zero if another driver is selected. The user should set HAVBSY non-zero after adding a busy test to the CP/M list device driver or the alternate console driver, or after installing custom driver subroutines that include a printer busy test.

Code for four distinct printer drivers is provided in USER4, and thus accessible to user modification. Location CSWTCH, described above, determines which driver is called.

Driver Entry Points

As discussed in Section 2, WordStar must be able to input from the printer as well as output to the printer when a "Communications protocol" (as required for daisy wheel and similar printers at 1200 baud) is in use. Also, WordStar's performance improves when a "printer busy test" is available to determine whether the printer is ready to accept an output character. Thus, each driver has three entry points, defined as follows:

Printer Busy Test: This entry should return the carry flag set (1) if the printer is NOT ready to accept a character; the carry flag should be returned clear (0) if the printer is ready to accept a character or if the busy test is not implemented. If this entry is implemented, HAVBSY (above) should be non-zero; if not implemented, HAVBSY should be 0.

Print Character: This entry should output the character in the A register to the printer. If HAVBSY is non-zero, this entry is not called until the printer busy test entry returns the carry flag clear.

Input Character From Printer: This entry need be implemented only if a communications protocol (Section 2) requiring input from the printer is to be used. This entry should return the carry flag set (1) if no character has been received from the printer since last called, or return the character in the A register and the carry flag clear (0) if a character has been received.

Specific descriptions of the printer drivers follow.

CP/M List Device Driver

The "print character" entry point to this driver is implemented to make the appropriate operating system call to print the character. The "printer busy" and "input character from printer" entries are not implemented, as standard CP/M provides no system calls for these purposes; space is provided at LIBSY and LISINP respectively for patching in JMP instructions to user-installed subroutines for these purposes. For finding space into which to patch added subroutines, see the end of the subsection on "Printer Driver Flags" earlier in this section.

If you add a "printer busy test" routine, patch HAVBSY to a non-zero value.

If you use a communications protocol with the List output driver, you must code and patch in an "Input character from printer" routine, and put a JMP to it at LISINP.

WordStar's Port Driver

The "Port driver" does direct hardware I/O to any printer interface using at most one output data port, one output status port, one input data port, and one input status port. The ports may be I/O ports or memory-mapped ports. The port driver includes implemented printer busy test and printer character input routines. When the port driver is selected during installation, the INSTALL program will accept the port numbers and status bits from the operator, or, on request, try to find them experimentally as detailed in "Port Driver" under "Printer-Related Selections."

The port driver code is in USER4, and thus accessible for further modification if desired. Note that the port driver as shown in the USER4 listing access I/O ports with "IN" and "OUT" instructions, but that a NOP is present after each to allow substitution of "LDA" and "STA" instructions for memory-mapped I/O. INSTALL makes this substitution if memory-mapped I/O is specified.

Alternate Console Printer Driver

The alternate console driver will drive a printer interfaced to be one of the four physical console devices (TTY:, CRT:, BAT:, and UC1:) other than the terminal, under operating systems which support multiple console devices and device assignment via IOBYTE (location 3; see your operating system documentation). The alternate console driver supports character input from the printer, making it convenient for use with communications protocols (as required for daisy wheel printers interfaced at 1200 baud); the alternate console driver does not include a printer busy test unless added by the user at location ACBSY (if you add a busy test, be sure to patch HAVBSY non-zero).

The alternate console driver entries work by changing IOBYTE, doing the console input or output, then restoring IOBYTE. The IOBYTE console field value used for printer access is taken from location CONFIE. CONFIE is set to 0 by the INSTALL program when the TTY: printer driver is selected, or to 1 when the CRT: console driver is selected. One of the other two console devices may be accessed by patching CONFIE to 2 or 3.

User-Supplied Printer Driver Subroutines

Space is provided at PUSEND, PUBSY, and PUINP for patching in JMPs to user-coded and user-installed printer character output, printer busy test, and printer character input routines. For finding space into which to patch your routines, see the end of "Terminal Patch Areas," Section 6; also, you may patch over the other drivers if you do not expect to use them at a later date. Note that the printer character input routine is mandatory if a communications protocol is installed; otherwise, this routine is not needed. Also patch HAVBSY non-zero if the busy test entry is implemented, or zero if it is not implemented.

CSWTCH must be set to 2 to cause WordStar to call the user-installed printer driver subroutines; this patch may be achieved by selecting "User Subroutines" in INSTALL before patching in your routines.

OEM Daisy Printer Driver

The OEM printer driver is pre-configured to drive certain "OEM" daisy printers through the MicroPro "I/O Master," interface addressed at ports F8-FA hex, as detailed in Appendix D and Section 2. Modification of this driver should not normally be necessary; the OEM driver is not included in the USER4 listing in Appendix F.

INSTALL sets CSWITCH to 3 to invoke the OEM daisy printer driver when "I/O Master Interface / O.E.M Printer Combination" is selected at the Printer Menu.

COMMUNICATIONS PROTOCOLS

A communications protocol (Section 2) is normally used with a (serial) daisy wheel or similar printer interfaced at 1200 baud; in these cases, the communications protocol items are correctly set by the INSTALL program. However, the communications protocol logic will function with any printer (except an OEM daisy printer, for which it is not pertinent). For an unusual Teletype-like printer that requires a protocol, you may wish to patch these items.

Protocol Type (PROTCL)

PROTCL determines type of communications protocol. The types of protocols are defined in the program comments and also in Section 2:

    0: None
    1: ETX/ACK   (and see EAKBSZ, next)
    2: XON/XOFF

PROTCL is set by INSTALL in accordance with the selection made at the "Communications Protocol" menu.

ETX/ACK Message Length
(EAKBSZ—ETX/ACK Buffer Size)

EAKBSZ contains the message length for ETX/ACK protocol; it must be equal to or less than ONE-HALF OF the printer's buffer size, as WordStar keeps two "messages" active at a time. The default value (127) assumes the printer can hold a buffer of at least 254 bytes; be sure to reduce it if you install ETX/ACK protocol for a non-daisy printer with a smaller buffer. When a daisy wheel or similar printer is installed with ETX/ACK protocol, INSTALL automatically sets EAKBSZ for the buffer capacity of the particular printer selected.

Section 8
Additional Modifications

OTHER PATCH ITEMS

In addition to the previously described patch items relating to terminal and printer installation, WordStar can be patched for a number of additional items, including the following:

o   Command keys, including prefix relationships and keystroke synonyms

o   All texts — menus, error messages, question prompts, etc.

o   Initial values for help level and insert toggle

o   Initial values for all on-screen formatting options

o   Default page format

o   Flag characters (rightmost screen column)

o   Serial diasy wheel and similar printer function strings

o   OEM daisy printer driver

Complete listings of the patch areas for these items, along with discussions, are contained in a separate publication, the WordStar Customization Notes. If you are interested in obtaining a copy of that publication, contact MicroPro International Corporation.

Descriptions of a few additional patch items of particular interest follow. The items are identified here by label only; the items may be patched (and/or their current hexadecimal addresses obtained) by using INSTALL's patcher as described in Section 3. Further discussion of these and many other items, plus pertinent listings, are included in the WordStar Customization Notes.

Initial Help Level (ITHELP)

Change this byte to 0, 1, 2, or 3 as desired to set the "Help Level" in effect when WordStar is invoked.

Help Level Message (NITHLP)

Setting this byte to 0 enables display of the message

> For maximum help (full menu display),
> select Help Level 3 by typing ^JH3.
> This message will clear when a key is pressed.

at the start of the first edit if help level is 1 or 2. Setting this byte to FF suppresses the above message. Use 0 if ITHELP (previous item) is changed to 2 and some users will be new WordStar users to whom level 3 would be helpful. Use FF if ITHELP is 3, so the above message will not appear if the user types H2 at the no file menu before initiating an edit.

Initial Insert Toggle (ITITOG)

Change this byte to Ø to make WordStar come up with insertion OFF, FF hex to come up with insertion ON.

Initial No-File Menu Directory
Display Toggle (ITDSDR)

Set to FF hex to come up with directory display ON; to Ø to come up with directory display OFF.

Justification Toggle (INITWF+1)

Set this byte to Ø to come up with justification OFF (ragged right); set to FF hex to come up with justification ON.

Hyphen-Help Toggle (INITWF+4)

Set this byte to Ø to come up with "Hyphen-help" OFF; FF hex to come up with "Hyphen-help" ON.

Decimal Point Character (DECCHR)

This byte is normally 2E hex to designate a **period** as the decimal point in decimal tabs; European users might wish to change to 2C hex (**comma**).

Hyphenation Pauses (HZONE)

Decrease for more hyphenation pauses (i.e., to hyphenate shorter words) under ^B with Hyphen-help on; increase for fewer such pauses. Normal value is about 4.

Form Feeds (PODBLK+1)

Default for the Print and MailMerge USE FORM FEEDS question: make FF hex to use form feeds unless operator explicitly enters a "no" response.

Omit Page Numbers (ITPOPN)

Default omit-page-numbers flag: patch non-zero for implied ".OP" at beginning of each file, i.e., to omit page number at bottom of each printed or Merge-printed page unless and until .PN dot command is encountered in document.

Variable Name Delimiters
(VARCH1 and VARCH2)

Delimiter characters used before and after variable names where the variable value is to be inserted in a document being MailMerged. VARCH1 is the character used before the variable name; VARCH2 is the character after the variable name. Both are normally "&". They may be changed if desired; if changed, they may be the same or different.

Data File Field Delimiter (RVELIM)

Delimiter character used between fields in a <u>data</u> file being read by Mail-Merge. Normally 2C hex (comma).

Initial Default to N Mode (NONDOC)

Patch to OFFH to enable default entry to non-document mode (N) after response
to the prompt, "FILENAME.TYP."

Automatic Backspace Characters
(AUTOBS through AUTOBS+9)

Up to 10 "autobackspace" characters may be defined by entering their ASCII
codes at **AUTOBS** and following locations. Whenever one of these characters is
typed during text entry, WordStar will automatically enter a backspace print
control (^H) into the file after the character. This feature reduces the
number of keystrokes required to enter text containing accent marks, in cases
where the accent marks are separate characters on the printer. For example, if
you patch 60 hex (the ASCII code for "`") at **AUTOBS**, then whenever "`" is
pressed during text entry, "`" and a control-H are entered into the file,
making it possible to enter "à" with the keystrokes `, a only.

PATCHING WORDSTAR'S PRINTER DRIVER
FOR CERTAIN TERMINALS

Altos

	FUNCTION		2.10	2.25	.93A	1.01	VALUE HEX
1.	MASK ALL BUT BUSY BITS (ANI)		72C	72C	5E8	618	04
2.	MAKE BITS ONE IF READY (XOR)		72E	72E	5EA	61A	04
3.	OUTPUT PORT (DATA)		734	734	5F0	620	1E
4.	INPUT PORT (DATA)		741	741	NUSD	62D	1E
5.	MASK FOR CHAR FRM PTR READY		73B	73B	5F6	627	01
6.	MAKE BITS ONE FOR CHAR READY		73D	73D	5F8	629	01
7.	STATUS PORT		729	729	606	615	1F
			738	738		624	1F

INSTALLATION NOTES: Uses port designated as printer port in ALTOS
                     documentation.

                     NUSD = NOT USED IN THIS VERSION

Dynabyte

	FUNCTION				ADDRESS			VALUE	
			2.10	2.25	.93A	1.01		HEX	
1.	MASK ALL BUT BUSY BITS (ANI)		72C	72C	5E8	618		10	
2.	MAKE BITS ONE IF READY (XOR)		72E	72E	5EA	61A		10	
3.	OUTPUT PORT (DATA)		734	734	5F0	620		86	
4.	INPUT PORT (DATA)		741	741	NUSD	62D		80	
5.	MASK FOR CHAR FRM PTR READY		73B	73B	5F6	627		08	
6.	MAKE BITS ONE FOR CHAR READY		73D	73D	5F8	629		08	
7.	STATUS PORT		729	729	606	615		83	
			738	738		624		83	
8.	ZERO THESE ID DATA INPUT &		UNSD	UNSD	5FB	UNSD		00	
	OUTPUT PORTS ARE NOT SAME		UNSD	UNSD	5FC	UNSD		00	
	(not relevant to RELEASE's		UNSD	UNSD	5FD	UNSD		00	
	1.00 and later)		UNSD	UNSD	5FE	UNSD		00	
			UNSD	UNSD	5FF	UNSD		00	
			UNSD	UNSD	560	UNSD		00	

NOTES: 04-28-80 - It will be necessary to connect pins 4,6,8, and
                      20 at the printer side of the cable to each
                      other.   The pins at the computer side can be
                      left unconnected.   This will provide that all
                      handshaking is done via software (this means
                      you must use ETX/ACK protocol).

                      UNSD = NOT USED IN THIS VERSION

Vector Graphics

	FUNCTION		ADDRESS			VALUE	
			2.1	2.25	1.01	HEX	
1.	MASK ALL BUT BUSY BITS (ANI)		729	729	618	01	
2.	MAKE BITS ONE IF READY (XOR)		72C	72C	61A	01	
3.	OUTPUT PORT (DATA)		734	734	620	06	
4.	INPUT PORT (DATA)		741	741	62D	06	
5.	MASK FOR CHAR FRM PTR READY		73B	73B	627	02	
6.	MAKE BITS ONE FOR CHAR READY		73D	73D	627	02	
7.	STATUS PORT		729	729	615	07	
			738	738	624	07	

NOTES: 04-28-80 - You will very likely have some difficulty
                      bringing **WORDSTAR** up on a VECTOR GRAPHICS MZ
                      but this has nothing to do with the printer
                      patch. See the document "NOTES ON CONFIGURING
                      WORDSTAR FOR THE VECTOR GRAPHICS MZ", available
                      from MICROPRO.

                      UNSD = NOT USED IN THIS VERSION
                      NR   = NOT REQUIRED

WORDSTAR FOR MP/M

A WordStar which is targeted for use under MP/M should be installed to take
advantage of certain MP/M-specific functions and/or avoid certain CP/M-specific
conditions.

TCKFLG: The use of the MP/M system clock for determining certain timing
functions within WordStar will significantly improve performance when more than
one WordStar is running under the same MP/M system. Changing TCKFLG: from 00
to FFH will cause WordStar to utilize the MP/M clock rather than its own
isolated 16-millisecond timing loop.

RSTFLG: Due to the presence of a number of USERS on a single system and to the
nature of multi-operating systems in general, the normal disk "remounting" or
RESET function is often a nuisance. This reset function can be suppressed for
operation in MP/M environments by patching the flag RSTFLG: to FFH.

NMOFUS: NMOFUS+1: The number of users on the system is set to 1, but can be
patched to handle up to 255.   Resetting will increase throughput of WordStar
under MP/M (or on a console-driven, interrupt-driven computer), and will cause
WordStar not to poll CSTAT as often.   Be sure to set NMOFUS+1:=NMOFUS: for
initial response.

DEFDSK: Due to the possible configurations of the multiple user files, it is
sometimes desirable to redefine the disk (read USER) to which WordStar will
automatically go to find the overlay files.   This can be done by placing
the suitable drive number in **DEFDSK:** where A: is 01H, B: is 02H, etc.

Appendix A
INSTALL Error Messages

This appendix provides explanations of the messages that can be displayed while you are running INSTALL (Section 3).

NOT ENOUGH MEMORY TO RUN INSTALL,
OR YOUR OPERATING SYSTEM IS NOT
RELOCATED TO MAKE ALL RAM AVAILABLE.

> This message will occur when INSTALL is invoked if your computer system contains insufficient memory. Also, this message will occur even when sufficient memory is present in the computer but your operating system (CP/M or equivalent) has not been "relocated" to make the RAM available. Such relocation is accomplished with a system command sometimes called "CPM", "MOVCPM", or "RELOC" — see your system documentation for details.

NOT ENOUGH MEMORY TO RUN WordStar,
OR YOUR OPERATING SYSTEM IS NOT
RELOCATED TO MAKE ALL RAM AVAILABLE.

> This variation of the preceding message will occur when the memory available is sufficient to run INSTALL, but not enough to run WordStar. If you get this message, you can still produce an installed WordStar on a diskette file (for use after more memory has been made available on the system, or for use on a different system) by re-invoking INSTALL and specifying Installation Option B. This error message can occur only on normal installation and on those options which run the installed WordStar after installation has been completed. See Section 1 for WordStar's RAM memory requirement.

WSU.COM NOT FOUND ON CURRENT DISK

> This message occurs during "normal" installation, or under Installation Option A ("Installation Options," Section 3) if the uninstalled WordStar (file WSU.COM) is not found on the logged drive. For example, if WSU.COM is not on the diskette in any drive, or if the current drive is A: but file WSU.COM is on the diskette in drive B. Copy WSU.COM onto the diskette in use, or use installation option B or C to read it from the diskette in another drive.

THAT FILE DOES NOT EXIST.

> This message does not occur during "normal" installation. Under Installation Option B, C, or D, this message indicates that no file was found with the name you entered for the WordStar to be installed. This message usually indicates that the name was mistyped, the drive was omitted, or the desired diskette was not in the drive. After displaying the message, INSTALL asks for the file name again, allowing you to enter the corrected name or allowing you to reenter the name after inserting the correct diskette.

INCORRECTLY FORMED FILENAME

> Under Installation Options B, C, and D, this message indicates that a file name entered was not a correctly formed CP/M file name as described in the **Reference Manual**. After displaying this message, INSTALL will repeat the file name question. Enter the corrected filename.

UNEXPECTED END OF FILE DURING READ

> The file from which the uninstalled WordStar was being read was shorter than expected. This message may indicate that you are using a bad copy of WSU.COM -- try getting a fresh copy from your distribution diskette. If you entered the file name under Installation Option B, C, or D ("Installation Options," Section 3), this message may indicate that the file you named was not a WordStar.

DISK FULL

DISKETTE DIRECTORY FULL

> The diskette, or its file directory, has filled up while attempting to record the installed WordStar. After this message, the WS.COM (or other file being written under Installation Option B, C, or D) will not be valid. Arrange more diskette space (e.g., by copying some files off onto another diskette), then repeat installation.

ERROR CLOSING FILE

> This message should not occur; it indicates a system failure, or that you changed diskettes while INSTALL was recording the installed WordStar.

This version of INSTALL is incompatible with the
version of WordStar you are trying to install

> This message can occur on using one release of INSTALL with a different release of WSU.COM, or with a previously installed WordStar of a different release. Use INSTALL and WSU from the same distribution diskette together. This message may also occur if the file from which the uninstalled WordStar is being taken (WSU.COM, or name entered by operator under Installation Option B, C, or D) does not actually contain a WordStar.

> The INSTALL sign-on message, showing the release number, and the WordStar sign-on message, showing its release number, are displayed on the screen below this error message.

Appendix B
WordStar Versions for
Specific Computer Systems

Most computer systems use the standard version of WordStar, as documented in the rest of this manual. Special versions of WordStar are distributed for a few specific systems which require a highly specialized adaptation of WordStar. This appendix describes the differences of these special versions from the standard version.

If your system is not shown in this appendix, then it uses the standard version. The standard version is adapted to your terminal and printer using the INSTALL program, as described in Sections 2-4.

HEATH 89 VERSION

The "Heath 89 Version" is intended to run on Heath 89 and Zenith 89 computers which have ROM in the first 16K. This version is origined at 4300 Hex (rather than the usual 100 Hex) and has the terminal pre-installed.

Note

An "A" appended to the release number (e.g., "2.25A") indicates the 4300 hex origin.

(For Heath and Zenith 89 computers which have been modified to accept programs origined at 100 Hex, the regular version of WordStar is used. Select "Heath or Zenith 89" as terminal when INSTALLing.)

Since the terminal is pre-installed, a file called "WS.COM" is supplied on the distribution diskette in place of the usual "WSU.COM".

Upon receiving your Heath 89 WordStar, do the following:

1. Format a blank diskette with the FORMAT program and place a CP/M system image on the diskette using the SYSGEN program.

2. Use FILECOPY to copy WS.COM, WSMSGS.OVR, WSOVLY1.OVR and INSTALL.COM from the distribution diskette to the newly formatted diskette.

The edit function may now be used, as the Heath 89 WordStar is supplied with the terminal pre-installed. To select a specific printer (or a different terminal, if you have an external terminal connected to your Heath/Zenith 89), use the INSTALL program (Section 3). Because of the limited capacity of a Heath/Zenith 89 diskette, it is necessary to write the newly installed WordStar back onto the same file. We suggest the following steps:

3. Invoke INSTALL by typing INSTALL and pressing RETURN (Section 3).

4. Press N to get to the installation options menu.

5. Press D to select installation option D ("Installation Options," Section 3). Enter the filename WS.COM.

6.   The space bar may be used to bypass the terminal menu.

7.   Make the desired printer selections ("Printer-Related Selections,"
     Section 3), and complete INSTALLation in the usual manner ("Bypassing
     the Patcher" and "Confirming or Correcting Your Selections," Section
     3).

TRS-80 MODEL I VERSION

Installation

Upon receiving your TRS-80 Model I WordStar, do the following:

1.   Format a blank diskette with the FORMAT program and place a CP/M
     system image on the diskette using the SYSGEN program.

2.   Use PIP to copy WS.COM, WSMSGS.OVR, WSOVLY1.OVR and INSTALL.COM from
     the distribution diskette to the newly formatted diskette.

The edit function may now be used, as TRS-80 Model I WordStar is supplied with
the terminal pre-installed. To select a specific printer (or a different
terminal, if you have an external terminal connected to your TRS-80), use the
INSTALL program (Section 3). Due to the limited capacity of a TRS-80 diskette,
it is necessary (in a single drive system) to write the newly installed
WordStar back onto the same file. We suggest the following steps:

3.   Invoke INSTALL by typing INSTALL and pressing RETURN (Section 3).

4.   Press N to get to the installation options menu.

5.   Press D to select installation option D ("Installation Options,"
     Section 3). Enter the filename WS.COM.

6.   The space bar may be used to bypass the terminal menu.

7.   Make the desired printer selections ("Printer-Related Selections,"
     Section 3), and complete INSTALLation in the usual manner ("Bypassing
     the Patcher" and "Confirming or Correcting Your Selections," Section
     3).

TRS-80 Keyboard

The TRS-80 Model I lacks a number of keys present on normal terminals. The
following keys on the TRS-80 keyboard are used to perform the indicated
functions in WordStar:

Regular key	TRS-80 key	Comments
CTRL	DOWN ARROW	To enter a control character, hold DOWN ARROW and press desired letter.
RETURN	ENTER	
ESCAPE	Hold DOWN ARROW, press UP ARROW	
DELETE, RUBOUT	BREAK	Delete character left of cursor
^H or ^S	LEFT ARROW, ^H, or ^S	Backspace cursor
TAB or ^I	RIGHT ARROW or ^I	Advance to next tab stop
(alpha lock)	CLEAR	Set keyboard for upper case letters only. Press again for lower case.

APPLE II VERSION

System Requirements

Welcome to WordStar! To be able to run WordStar on an Apple II computer, you must have the following:

o   A 48K or 64K Apple II computer (64K is not necessary, but is highly recommended—use either the language card or a 16K RAM card)

o   A MicroSoft Z-80 soft card

o   An 80-column video board (either the Videx VideoTerm or the M&R Sup'R'Terminal)

o   One of the following systems:

DOS 3.2 (for the 13-sectored version of WordStar)

or

DOS 3.3 or the language system (for the 16-sectored version of WordStar)

Note

With either the language card or a 16K RAM card, more pages of text (about ten) can be put in memory for fast access. Without the additional 16K, text access will be slowed down as fewer pages are held in memory and the computer must access the disk drive more often. (EXAMPLE.TXT will not be available on the 13-sectored version.)

Installation

Upon receiving your Apple II WordStar, first study the Microsoft CP/M Manual, then do the following:

1. Format a blank diskette with the Microsoft FORMAT program (pp. 1-9 in the Microsoft manual).

2. Use the Microsoft COPY program to make a backup of the distribution WordStar diskette (pp. 1-10 in the Microsoft manual).

3. Place an image of your Microsoft CP/M operating system on the backup diskette.

    a. Do this by running the COPY program again; but this time, use the /S option (see COPY in the Microsoft CP/M manual.

    b. The /S function copies only the operating system to the backup diskette, rather than the entire disk.

    c. If you forget to use the /S for this step, you will just copy the CP/M disk onto your WordStar disk again.

4. Run the INSTALL program by typing INSTALL and pressing RETURN (Section 3 of this manual).

Ordinarily, INSTALL takes the original distribution file (WSU.COM) and writes a new file for a particular system (WS.COM or some other name). But because of the the limited capacity of an Apple II diskette (especially the 13-sector formatted version), you will have to use the same file name (WSU.COM) to put the newly installed WordStar back onto the disk. Steps 5-7 may be used:

5. Press N (for NO) to get to the WordStar installation options menu.

6. Press D to select installation option D (writing back to the same file—Section 3).

7. The computer will ask you for the name of the file that you are installing. Type WSU.COM and press RETURN.

A set of choices about the way your system is set up will appear on the screen. Now you should see Terminal Menu 1. Press 3 to move on to Terminal Menu 3, then select "=" to get the Apple II menu, which is the one that you use to select the 80-column video board.

8. In the Apple II menu, select the appropriate combination of 80-column videocard, upper/lower (U/L) case conversion method and availability of shift key modification (optional but recommended for extensive use of the shift function).

There are two major classes of video boards, represented by the following two products:

o   Videx Videoterm (cursor on)

o   M&R Sup'R'Term (cursor off)

The first class (Videoterm) leaves the cursor on at all times. This should be your first choice for a trial video board if you are not using either of the video cards named above. If you cannot see the cursor, try the other option (Sup'R'Term).

If you have the hardware to generate lower-case, then select the **"hardware U/L conversion"** option; otherwise, select the **"software U/L conversion"** option to allow WordStar to perform the conversion. Finally, by using the very simple shift key modification (see your Apple dealer), you can enable the software U/L conversion to use the SHIFT key instead of the ESC key to perform the shift function. Just select the "shift key mod" option.

> 10. Make the desired printer selections (Section 3) and complete installation in the usual manner.

> 11. Finally, after exiting to the operating system, rename the file (from WSU.COM to WS.COM).

The Apple II Keyboard

The Apple II lacks some keys found on most terminals. In particular, there is no provision for generating lower case or a number of special characters. If the "software U/L case conversion" option was selected during installation, then WordStar will provide for generation of lower case, as well as the full ASCII character set.

The ESC key is used by the Apple II for the shift lock/unlock function. In addition if the SHIFT key modification is **not** installed then ESC also doubles as the shift key. In this case, press ESC **twice** for shift lock and **once** for regular shift. Note that the ESC key is also used for WordStar functions. Whenever you press ESC for a WordStar function, an additional press or two will be needed to return to the proper upper/lower case mode. (A little experimentation here can be helpful.)

The LEFT ARROW key, which was previously a backspace (CTRL H), has been translated to give the RUBOUT code. This allows LEFT ARROW to be used to delete a character to the left of the cursor. If the SHIFT key modification has been made the FORWARD ARROW key can move the cursor to the right without altering the text under it.

The nine ASCII characters not usually available from the Apple II Keyboard are software generated in the <u>lock</u> mode.

WordStar has adapted the <u>alpha lock</u> function (using the ESC key as described above) to give you the complete set of possible characters, including some that don't appear on the Apple II keyboard. For example, normally you get an exclamation point when you hold the SHIFT key down and press <u>l</u>. However, when you are in <u>alpha lock</u> mode, you will see a vertical line instead on the screen. The same principle applies in the following cases:

Key	SHIFT Key in Unlocked Mode	SHIFT Key in Alpha Lock Mode
"1"	Exclamation Point (!)	Vertical Line (|)
"7"	Closing single quote ( )	Opening single quote ( )*
"="	Equal Sign (=)	Underline (_)
"?"	Question Mark (?)	Backslash (\)
"8"	Left Parenthesis (()	Left Brace ({)
"9"	Right Parenthesis ())	Right Brace (})
","	Left Angle Bracket (<)	Left Square Bracket ([)
"."	Right Angle Bracket (>)	Right Square Bracket (])
"M"	Capital "M" (M)	Tilde (~)

* Cannot be displayed by the Sup'R'Term; you will see a space instead.

To type "@" and "^," use alpha lock mode with the shift key depressed, just as the key tops indicate.

Appendix C
Specific Terminals

EXPLANATION

This appendix describes features available and gives configuration hints for many of the terminals on INSTALL's terminal menu.

Note

If your terminal had an auto line feed switch, make sure it is OFF.

THE TERMINALS

Beehive 150

No highlighting, erase to EOL, or line insert/delete implemented.

Cromemco 3100

Same as Beehive 150.

Hazeltine 1500

AUTO LINE FEED switch (under little cover above keyboard) must be OFF. Highlighted text displays dim. Erase end line and line insert/delete are used.

Hewlett-Packard 2621 A/P

No highlighting, erase EOL, or line insert/delete implemented.

IMSAI VIO

This includes the IMSAI VDP-40, VDP-80, PCS 80/30, and other integrated systems containing the VIO display board. Highlighting and cursor display is by inverse video; WordStar blinks the cursor when necessary to distinguish it from highlighted areas. The video RAM is accessed directly at F000 hex, producing fast screen update. The VIO must have the firmware ROM (as it always does in the above integrated systems), or equivalent routines must be present in your operating system.

Infoton I-100

Highlighted text displays dim; line insert/delete are implemented.

Lear-Siegler ADM-3A

The CURSOR CONTROL switch inside the terminal must be ON; the SPACE/ADVANCE switch should be set to SPACE. No highlighting.

Lear-Siegler ADM-31

Highlighted areas display dim. Erase end line and line insert/delete are used.

MicroTerm ACT IV

Highlighted text displays dim, assuming terminal was in dim state when WordStar invoked. Erase end line implemented; terminal does not have line insert/delete invocable from CPU.

Processor Technology VDM / SOL

The VDM is accessed through the operating system; ØB hex is sent to clear the screen, escape, 2, line number, escape, 1, column number is sent to position the cursor. No other functions are implemented. WordStar's working with the VDM depends on the particular adaptation of CP/M to the VDM not interfering; in particular, transmission of all line feeds and all non-redundant carriage returns must occur.

Soroc IQ-120

No highlighting, erase EOL, or line insert/delete implemented.

Appendix D
Specific Printers

DAISY WHEEL AND SIMILAR PRINTERS

Features

All printers described in this section support all of WordStar's print enhance-
ments and other features, as described in the **Reference Manual**, except as noted
in individual descriptions below. All printers described here will print
bidirectionally; "formed" text will printed with Microspace Justification.

Choice of Typewheels

The interchangeable typewheels for daisy printers come in many choices of
characters and character arrangements. The printed characters will match those
seen on the screen during editing only if the typewheel in use contains the
standard ASCII characters in the standard ASCII order. Some typewheels have
other character graphics; many have a different character arrangment so that,
for example, a period in the document will print as some other character. Some
compatible typewheels for each printer are listed below.

OEM DAISY WHEEL AND SIMILAR PRINTERS

WordStar can drive the following "OEM" (Orginal Equipment Manufacturer) daisy
wheel and similar printer models when interfaced with the MicroPro "I/O Master"
interface board:

    Diablo Hy-Type II 1300 Series
    Qume Sprint 3 (with cable adapter)
    Nec Spinwriter 5500D

The OEM printers provide simple installation and unexcelled performance with
WordStar and are generally the least expensive to buy; their chief disadvantage
is that they are more difficult to drive from other software than other types
of printers.

The above printers have a 24-bit parallel interface using a very different
command structure from that of all other printers supported by WordStar. One
installation selection specifies any of these printers, selects the OEM printer
driver in WordStar, and specifies the "I/O Master" (or IMSAI PIO-4) interface
board. When installed for an OEM printer, WordStar accesses the printer
interface directly. No operating system routines are used, and many
installation complications are thus avoided. A "printer busy test" is
provided, resulting in good response when editing and printing simultaneously.

Interfacing

For any of the OEM printers listed above, use the MicroPro "I/O Master" inter-
face board with the OEM printer ports addressed at F8 through FA hex. Connect
the interface board to the printer with the MicroPro printer cable (using an
adapter as noted below with the Qume Sprint 3).

An IMSAI PIO-4 board addressed at ports F8 through FB may also be used; the cable required is the same as the cable previously supplied by IMSAI, plus an additional conductor bringing the printer's "data 1/2" bit to bit 4 of port F9.

Installation

To install WordStar to drive any of the OEM printers listed above through either of the interfaces listed above, select "I/O Master / OEM Printer" at INSTALL's printer menu (see "Printer-Related Selections," Section 3). The same selection works with all the supported OEM printers and interfaces. The OEM daisy printer driver is pre-configured for the standard OEM printer port numbers and bit assignments used with the "I/O Master" interface. (Extensive modification would be required to drive another interface or to change the port numbers. A listing of the code that would require modification is available in the WordStar Customization Notes.)

Diablo Hy-Type II (1300 Series)

INTERFACING

The MicroPro printer cable can be used.

COMPATIBLE TYPEWHEELS

         Diablo 38100 Courier 10
         Diablo 38107 Courier 72
         Diablo 38101 Pica 10
         Diablo 38102 Elite 12
         Qume   82167 Prestige Elite 12

Qume Sprint 3

INTERFACING

The cable adapter (available from Qume) that provides a Diablo-compatible termination from this printer's connector is necessary in order to mate with the MicroPro printer cable.

COMPATIBLE TYPEWHEELS

Compatible Typewheels for the Qume Sprint 3 are as listed above for the Diablo Hy-Type II.

NEC Spinwriter 5500D

INTERFACING

The MicroPro printer cable can be used.

This is the Hy-Type-II-compatible version of NEC's OEM thimble printer.

The NEC 5500D will buzz and stop printing if the (carbon) ribbon is used up, the paper runs out, or the cover is opened. Install a new ribbon, new paper, or close the cover, and printing will continue with no character loss.

SERIAL DAISY WHEEL AND
SIMILAR PRINTERS

The descriptions in this section apply to the following printers, which have "serial" interfaces:

    Diablo 1610/1620/1640/1650
    Qume Sprint 5
    Nec Spinwriter 5510/20

Some of the manufacturers also supply equivalent versions with an 8-bit parallel interface; installation should be similar to the serial versions and the descriptions here should be generally applicable.

Controls

Most serial daisy wheel and similar printers have a control panel including some or all of the following switches:

AUTO LF: must be **OFF**.

AUTO CR: should be OFF.

Line Spacing 6/8 Lines per inch
Character Pitch 10/12 Characters per inch

   These switches have **NO EFFECT** on printing under WordStar. Character and line spacing under WordStar always default to 6 lines per inch and 10 characters per inch respectively, and may be modified via print directives imbedded in each document (**Reference Manual**). After printing with WordStar, the printer is left set to the switch settings for use with other software, except as noted below.

FORM LENGTH: set to match length of paper in use — commonly 11 inches or 66 lines; setting does not matter if USE FORM FEEDS print option (Section 11) will not be used and you don't wish the FF switch to work.

SET TOF: depress after positioning paper at top of form; necessary only if USE FORM FEEDS print option is to be used or you wish the FF switch to work.

FF or FORM FEED: depress to feed paper to top of form, e.g. after aborting print.

Installation

All daisy wheel and similar printers interfaced at 1200 baud (120 characters per second) must be installed with a "communications protocol" (as discussed in Section 2) in order to avoid buffer overrun and consequent character loss (a possible exception for the NEC is noted below). At speeds slower than 1200 baud, these printers print slowly; you will find the effort invested to install one of these printers with a communications protocol rewarding because of the markedly increased printing speed.

Caution

Do not attempt to use ETX/ACK protocol in your operating system when
driving a Diablo or Qume printer from WordStar. It won't work. If
your operating system already can drive a Diablo or Qume printer at
1200 baud through the use of ETX/ACK protocol, the portion of the
operating system which implements the protocol must be disabled or
bypassed when printing from WordStar.

This limitation does not apply to XON/XOFF protocol, nor to NEC
printers. (The reason for this limitation is that if an "ETX" in-
serted in the character stream happens to fall within an "escape
sequence" being transmitted to the printer, the printer will not
recognize it as an ETX, and not respond with an ACK; nor will the
printer interpret the escape sequence correctly. Keeping the ETX's
out of the escape sequences is practical only in the program genera-
ting the character stream; WordStar contains the necessary special
code.)

Diablo 1610/1620

FEATURES

The "phantom space" and "phantom rubout" features of WordStar
(**Reference Manual**) are not supported by these printers.

After printing, WordStar leaves these printers set for 6 lines per inch and 10
characters per inch. To set the character spacing according to the printer's
"spacing 10/12" switch before use of other software, depress the "Clear"
button. If other software has printed on the printer since it was powered up
and before WordStar prints, you may, in unusual cases, find it necessary to
press the printer's "clear" button, or to turn the printer off and on, before
WordStar will print correctly (this is because the Diablo 1610/20 has no
provision for a full reset initiated from the computer).

INSTALLATION

When installing WordStar to use a Diablo 1610/1620 printer interfaced at 1200
baud (120 characters per second), specify "ETX/ACK" protocol, and a driver
capable of inputting characters, as discussed in Section 14. No settings are
required on the printer for ETX/ACK operation. These printers do not support
XON/XOFF protocol.

COMPATIBLE TYPEWHEELS

Compatible Typewheels for the Diablo 1610/1620 include:

        Diablo 38100   Courier 10
        Diablo 38107   Courier 72
        Diablo 38101   Pica 10
        Diablo 38102   Elite 12
        Qume   82167   Prestige Elite 12

Diablo 1640/1650

FEATURES

Form Feeds cannot be used with the Diablo 1640 and 1650; the USE FORM FEEDS
question does not occur in the print initiation dialog (**Reference Manual**) when
WordStar has been installed for a 1640 or 1650.

INSTALLATION

When installing WordStar to use a Diablo 1640/1650 printer interfaced at 1200
baud (120 characters per second), specify "ETX/ACK" protocol, and a driver
capable of inputting characters, as discussed in Sections 2-5. A switch set-
ting may be necessary inside the printer to enable ETX/ACK protocol (switch 2
on the HPRO4 circuit board, if operator control panel is fitted, or as de-
scribed in your Diablo manual). These printers also support XON/XOFF protocol
(Diablo calls it DC1/DC3 protocol); a switch setting is necessary inside the
printer to enable this protocol (switch 3 on HPRO4 circuit board, or as de-
scribed in your Diablo manual).

COMPATIBLE TYPEWHEELS

Compatible typewheels for the Diablo 1640 are as listed for the 1610/20 above.

Qume Sprint 5

INSTALLATION

When installing WordStar to use a Qume Sprint 5 interfaced at 1200 baud (120
characters per second), specify "ETX/ACK" protocol, and a driver capable of
inputting characters, as discussed in Sections 2-5. No settings are required
on the printer for ETX/ACK operation. The Qume Sprint 5 does not support
XON/XOFF protocol.

COMPATIBLE TYPEWHEELS

Compatible Typewheels for the Qume are as listed above for the Diablo 1610/20.

NEC Spinwriter 5510/5520

FEATURES

The "phantom space and "phantom rubout" features (**Reference Manual**) are not
supported on, nor relevant to, these printers.

When WordStar is installed for a NEC spinwriter 5510/5520, two of the User
Printer Function print control characters (Section 10) are defined as follows
to permit access to additional characters on NEC print thimbles (typing
elements) with more than 94 graphics:

> ^Q sends "shift out" code to printer; changes to alternate char-
>   acter definitions, as described in your NEC documentation, until
>   ^W is encountered in document.

^W sends "shift in" code to printer; restores normal character
definitions after use of ^Q.

The NEC 5510/5520 will buzz and stop printing if the (carbon) ribbon is used
up, the paper runs out, or the cover is opened. Install a new ribbon, new
paper, or close the cover, then press the "Reset" switch, and printing will
continue with no character loss.

INSTALLATION

When installing WordStar to use a NEC Spinwriter 5510/5520 at 1200 baud (120
characters per second), a communications protocol or a special cable must be
used to prevent buffer overrun and character loss. The NEC printer is extreme-
ly versatile; we know of four possible solutions to the buffer overrun problem:

1. Check that the printer is set to use ETX/ACK protocol (switch 4 OFF
    on DIP switch SW1 on the circuit board behind the control panel, or
    as described in the NEC documentation). In the WordStar installation
    dialog, specify ETX/ACK protocol and a driver that can input
    characters from the printer (as discussed in Section 2-4). We sug-
    gest this as the normal solution.

2. Set the printer for XON/XOFF protocol (switch 4 ON on DIP switch SW1
    on the circuit board behind the control panel, or as described in the
    NEC documentation). In the WordStar installation dialog, specify
    XON/XOFF protocol and a driver that can input characters from the
    printer (as discussed in Section 2-4).

3. ETX/ACK or XON/XOFF protocol implemented in a printer driver
    installed in your operating system may also be used with a NEC
    printer. In this case, specify "None" for protocol in the WordStar
    installation dialog.

4. This is a hardware solution, requiring fabrication of a cable
    adapter. It may not work in all cases; if it works in your case it
    has the advantages that it works with other software in addition to
    WordStar, and that no communications protocol, nor a printer driver
    that can input characters, need be specified in WordStar
    installation.

5. Make up a cable adapter which runs the printer's "Reverse Channel"
    signal (line 19 of EIA connector) into the "Request to Send" line
    (pin 4 of EIA connector) of the computer's serial interface. Check
    that the printer is set to produce a "low" signal on buffer full
    (switch 5 OFF on DIP switch SW1 on the circuit board behind the
    control panel, or as described in the NEC documentation). This
    signal will cause the USART in the computer's serial interface to
    stop sending characters when the printer cannot accept them, without
    any special software considerations.

TELETYPE-LIKE (NON-DAISY) PRINTERS

The term "Teletype-like" printer includes almost any printer designed to be connected to a microcomputer. The printer should return the carriage to the beginning of the line without advancing the paper upon receipt of a "carriage return code", advance the paper one line upon receipt of a "line feed" code, and print the appropriate character upon receipt of ASCII codes 20 through 7E hex. With such a printer, WordStar will not Microspace Justify nor print using variable line height nor variable character pitch. Subscripts and superscripts are printed in-line, or in the line below or above if it is a blank line; boldface is printed by overprinting the same characters three times; backspace is supported only if the printer can backspace.

If your printer has an AUTO LF switch, make sure it is **OFF**.

The following special features of specific Teletype-like printers may be supported via special installation (patching) done by the user as discussed in Sections 6-8:

> Choice of TWO character pitches via ^A and ^N print controls
> Choice of two ribbon colors via ^Y print control
> Ability to feed paper up <u>and down</u> a fractional line for superscripts and
>   subscripts
> Up to 4 other special features via ^Q, ^W, ^E, ^R print controls

Any printer shown explicitly in WordStar's printer selection menu should be installed with the appropriate selection, rather than as "Teletype-like", to make its full capabilities available.

"Any Teletype-like Printer"

This menu selection will drive any printer meeting the above description, with the limitations noted above. Use it when no other selections match or when in doubt about the applicability of other selections.

"Teletype-like Printer
That Can Backspace"

This menu selection is preferred for printers that can back up the carriage to the preceding character position on the same line upon receipt of an ASCII "backspace" code (08 hex). Use of this selection will yield faster printing of underline, boldface, and double strike, and makes the "backspace" print control available.

OTHER PRINTERS

Non-Return Printers

WordStar provides limited support of printers that cannot return the carriage without advancing the paper, such as Selectrics. If the printer can backspace, install as "Teletype-like printer that can backspace" and avoid use of over-print lines (**Reference Manual**). Other print enhancements will work as described for "Teletype-like" printers. If printer cannot backspace, install as "Any Teletype-like printer" and avoid use of underline, strike out, double strike, bold face, backspace, and overprint lines in your documents.

"Half-Line-Feed Printer"

This menu selection is provided for use with printers that advance one-half
line at a time, such as a Selectric with a half-line ratchet. Backspacing
capability is also assumed by this menu selection, but no ability to feed paper
backwards is required. The half-line advance is utilized to print superscripts
and subscripts half a line above and below, respectively, the rest of the text.
Two line feeds are transmitted between lines where no subscripts and super-
scripts appear. Depending on the characters your interface is equipped to
respond to, patching may be required after this selection is made; see Sections
6-8.

Appendix E
The Terminal Patch Area (USER1)

A listing of the WordStar user-modifiable module USER1 follows this page.
This assembly listing is supplied for the convenience of the occasional user
who may need to install WordStar for an unusual terminal or printer. Note that
this listing is for the standard TBASE=100 Hex version. For the TRS-80 Model I
version, and the Heath 89 version origined at 4300 Hex, add 4200 Hex to all
addresses shown in listings. For a discussion of this listing, see Sections 6-
8.

A separate publication, WordStar Customization Notes, is directed towards OEM's
and system programmers. The Customization Notes contain additional source
listings, including:

    o   default areas

    o   message files

    o   keyboard dispatch tables

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```
                        TITLE USER1     04/23/81    TERMINAL PATCH AREA

                      ;  FOR  WordStar RELEASE 3.0 May, 1981


                        ENTRY HITE,WID, CLEAD1,CLEAD2,CTRAIL,CB4LFG,LINOFF,COLOFF
                        ENTRY ASCUR,UCRPOS,ERAEOL,LINDEL,LININS,IVON,IVOFF
                        ENTRY TRMINI,TRMUNI,INISUB,UNISUB,DELCUS,DELMIS
                        ENTRY DEL1,DEL2,DEL3,DEL4,DEL5,NMOFUS,TCKFLG
                        ENTRY USELST,MEMAPV,MEMADR,HIBIV,HIBCUR,CRBLIV,ZAFCIN
                        ENTRY RUBFXF,RFIXER,UCONO,UCONI,UCNSTA,SWIN,SWOUT
                        ENTRY TRSCRS,TRSCIF,HETHBS,APLFLG,RSTFLG,DEFDSK,SCRLSZ
                        ENTRY MORPAT,PBGMEM


                        EXT OUTCHR, MEMORY

0100                    TBASE   EQU 100H   ;WHERE TO LOAD PROGRAM FOR NORMAL CP/M

0000'                           ASEG                  ;ABSOLUTE CODE, FOR LISTING

                                ORG TBASE+148H   ;BEGINS AT 248 HEX OR 4448 HEX

                                PAGE 63          ;SETS PAGE LENGTH
```

```
; ****************************************************
; *                                                  *
; *    USER-MODIFIABLE CONSTANTS AND ROUTINES FOR    *
; *    HARDWARE-DEPENDENT TERMINAL CHARACTERISTICS   *
; *    AND FUNCTIONS USED BY EDITOR                  *
; *                                                  *
; ****************************************************

;NOTE: THIS AREA IS NORMALLY PATCHED FOR YOUR TERMINAL
;TYPE VIA THE INTERACTIVE INSTALL PROGRAM.  ADDITIONAL
;PATCHING TO THIS AREA IS NEEDED ONLY FOR UNUSUAL TERMINALS
;OR UNUSUAL VIDEO BOARDS, OR TO MEET SPECIAL REQUIREMENTS
;OR ENHANCE OR PERSONALIZE PERFORMANCE.


;
; PATCHES ALWAYS NEEDED: SCREEN HITE & WIDTH, CURSOR.
;
; ALL OTHERS ARE OPTIONS FOR SPECIAL CASES OR ENHANCEMENT.
;


;
;    SCREEN SIZE
;
;    SCREEN HEIGHT AND WIDTH PATCHES ARE MANDATORY.
;
```

| Ø248 | 18 | HITE: | DB 24 | ;MUST BE EXACT SCREEN HEIGHT IN LINES |
| Ø249 | 5Ø | WID: | DB 8Ø | ;MUST BE <= EXACT SCREEN WIDTH |

```
;
; IN ALL CHARACTER STRINGS TO BE SENT TO TERMINAL,
; FIRST BYTE IS NUMBER OF CHARACTERS, CHARACTERS FOLLOW.
;
```

```
;                      PROVISIONS FOR PATCHING
;              CURSOR POSITIONING CONTROL SEQUENCES
;
;              CURSOR POSITIONING PATCH IS MANDATORY.
;

; CURSOR POSITIONING FOR MOST TERMINALS
; IS ACCOMPLISHED BY SENDING:
;
;    1.  A "LEAD-IN" STRING OF ONE OR MORE
;                TERMINAL-SPECIFIC CHARACTERS;
;    2.  THE LINE NUMBER, WITH AN OFFSET (OFTEN Ø)
;                ADDED; OR, FOR SOME TERMINALS,
;                THE COLUMN NUMBER IS SENT FIRST;
;    3.  ANOTHER LEAD-IN STRING, FOR SOME TERMINALS;
;    4.  THE COLUMN (OR LINE) NUMBER, WITH OFFSET;
;    5.  ANOTHER STRING (FOR SOME TERMINALS).
;
;    FOR MOST TERMINALS, THE LINE AND COLUMN ARE SENT
;    AS 1-BYTE BINARY NUMBERS; FOR A FEW TERMINALS,
;    TWO- OR THREE-DIGIT ASCII NUMBERS ARE SENT.
;
; FOR TERMINALS THAT DON'T FIT THE ABOVE PATTERNS,
; YOU MUST CODE YOUR OWN SUBROUTINE.

        ;CURSOR PATCH AREAS ARE ON NEXT PAGE
```

```
                              ; CURSOR POSITIONING...
                              ;                SEE COMMENTS PRECEDING PAGE

                              ; FOR EXAMPLE, THE CURSOR IS POSITIONED ON THE
                              ; ADM-3A TERMINAL BY SENDING:
                              ;      ESCAPE, =,
                              ;      LINE # PLUS 20 HEX,
                              ;      COLUMN NUMBER PLUS 20 HEX.
                              ; THE FOLLOWING PATCH AREAS ARE SET UP FOR THIS
                              ; TERMINAL, AS AN EXAMPLE.

                              ; CURSOR POSITIONING INITIAL LEAD-IN STRING
  024A     02         CLEAD1: DB 2        ;NUMBER OF CHARACTERS
  024B     1B                 DB 1BH              ;FIRST CHARACTER
  024C     3D                 DB '='              ;SECOND CHARACTER
  024D     00 00 00           DB 0,0,0            ;SPACE FOR MORE
  0250     00 00 00           DB 0,0,0            ;.. CHARACTERS

                              ; CURSOR POSITIONING STRING SENT BETWEEN
                              ;   LINE AND COLUMN
  0253     00         CLEAD2: DB 0        ;NUMBER OF CHARACTERS -
                                          ; NONE IN OUR EXAMPLE
  0254     00                 DB 0                ;FIRST CHARACTER
  0255     00 00 00           DB 0,0,0            ;SECOND THRU 4TH

                              ; CURSOR POSITIONING STRING SENT AFTER
                              ;   BOTH LINE AND COLUMN HAVE BEEN SENT
  0258     00         CTRAIL: DB 0        ;NUMBER OF CHARACTERS (NONE)
  0259     00 00 00 00        DB 0,0,0,0

                              ; FLAG NON-ZERO TO SEND COLUMN BEFORE LINE
  025D     00         CB4LFG: DB 0        ;LINE GOES BEFORE
                                          ;..COLUMN IN OUR EXAMPLE

                              ; OFFSET TO ADD TO LINE
  025E     20         LINOFF: DB 20H      ;ADD THIS TO LINE #
                                          ;(WHERE 0 IS TOP LINE ON
                                          ; SCREEN BEFORE OFFSET)

                              ; OFFSET TO ADD TO COLUMN
  025F     20         COLOFF: DB 20H      ;ADD THIS TO COLUMN #
                                          ;(WHERE 0 IS LEFT EDGE OF
                                          ; SCREEN BEFORE OFFSET)

                              ; BINARY / ASCII FLAG AND # ASCII DIGITS
  0260     00         ASCUR:  DB 0        ;ZERO TO SEND BINARY LINE & COLUMN
                                          ;2 TO SEND 2-DIGIT ASCII NUMBERS
                                          ;3 TO SEND 3-DIGIT ASCII NUMBERS

                              ;SEE NEXT PAGE FOR POSITIONING
                              ;CURSOR VIA USER-CODED SUBROUTINE
```

```
                                    ;CURSOR POSITIONING...

0261    00 00 00                    DB 0,0,0        ;BYTES RESERVED FOR EXPANSION
                           ;
                           ; PROVISION FOR POSITIONING CURSOR BY USER-CODED
                           ; SUBROUTINE INSTEAD OF UNDER CONTROL OF ABOVE ITEMS,
                           ; FOR USE IN EXCEPTIONAL CASES ONLY:
                           ;
                           ;  PUT A  JMP  INSTRUCTION TO YOUR SUBROUTINE IN
                           ;  FOLLOWING 3 BYTES.  WHENEVER FIRST BYTE IS
                           ;  NON-0, THIS LOCATION WILL BE CALLED TO POSITION
                           ;  CURSOR; ABOVE CURSOR PATCH ITEMS WILL BE DISREGARDED.
                           ;
0264    00                 UCRPOS: NOP     ;NORMALLY 0, OR JMP TO YOUR
0265    00                         NOP     ;SPECIAL CURSOR POSITIONING
0266    C9                         RET     ;ROUTINE.

                           ; SEE "MORPAT" AT THE END OF THIS LISTING
                           ; FOR SPACE TO PUT YOUR SUBROUTINE IN.

                           ;    YOUR SUBROUTINE WILL RECEIVE LINE IN L REGISTER
                           ; (0=TOP SCREEN), COLUMN IN H (0=LEFT EDGE).
                           ;    YOUR SUBROUTINE MAY ALTER ALL REGISTERS.
                           ;    TO OUTPUT A CHARACTER TO THE TERMINAL FROM WITHIN
                           ; YOUR SUBROUTINE, CALL OUTCHR.  EXAMINE THE FOLLOWING
                           ; 2 BYTES WITH YOUR DEBUGGER TO DETERMINE THE ADDRESS
                           ; TO CALL IN CURRENT RELEASE OF WORDSTAR:

0267    0000*                      DW OUTCHR       ;ADDRESS OF BYTE OUTPUT
                                                   ;ROUTINE LOADED HERE

                           ; YOUR CUSTOM CURSOR POSITIONING ROUTINE WILL ALSO
                           ; RECEIVE THE FOLLOWING, WHICH MIGHT BE USEFUL
                           ; IN SPECIAL VIDEO BOARD DRIVERS:
                           ;   DE=NUMBER OF CHAR POSITIONS FROM BEGINNING OF SCREEN
                           ;       TO NEW CURSOR POSITION (0=UPPER LEFT CORNER).
                           ;   BC=NUMBER OF CHAR POSITIONS FROM BEGINNING SCREEN TO
                           ;       BEGINNING OF LINE IN WHICH CURSOR IS BEING PLACED.

0269    00 00 00 00                DB 0,0,0,0      ;RESERVED BYTES
```

```
                              ;
                              ;EVERYTING THAT FOLLOWS IS OPTIONAL.
                              ;   EACH ITEMS RELATE EITHER TO ENHANCED PERFORM-
                              ;   ANCE (FOR EXAMPLE, USE OF INVERSE VIDEO
                              ;   OR BRIGHT/DIM TO SET OFF BLOCKS OF TEXT),
                              ;   OR TO ACCOMODATING UNUSUAL TERMINALS.
                              ;

                              ;ERASE TO END OF LINE. OPTIONAL - IF FUNCTION
                              ;NOT AVAILABLE, LEAVE FIRST BYTE ZERO AND EDITOR
                              ;WILL DO THE FUNCTION MORE SLOWLY VIA SOFTWARE.

Ø26D    ØØ  Ø2      ERAEOL: DB Ø       ;PUT NUMBER OF CHARCTERS HERE
Ø26E    ØØ  1ƒ              DB Ø       ;PUT FIRST CHARACTER HERE
Ø26F    ØØ  54              DB Ø       ;IF 2-CHAR SEQUENCE, PUT 2ND HERE
Ø270    ØØ ØØ ØØ ØØ         DB Ø,Ø,Ø,Ø ;IF 3 TO 6 CHAR SEQUENCE,
                                       ;PUT ADDITIONAL CHARS HERE.

                              ;DELETE SCREEN LINE CONTAINING CRSOR, MOVE
                              ;LOWER LINES ON SCREEN UP ONE LINE. OPTIONAL.
                              ;SUPPLYING THIS SPEEDS SCREEN UPDATE.

Ø274    ØØ     Ø3 1B 52  LINDEL: DB Ø        ;PUT LENGTH HERE
Ø275    ØØ ØØ ØØ              DB Ø,Ø,Ø  ;SPACE FOR 1-6 CHARACTERS
Ø278    ØØ ØØ ØØ              DB Ø,Ø,Ø

                              ;INSERT A BLNK LINE ON SCREEN, MOVING CURSOR
                              ;LINE AND LINES BELOW IT DOWN ONE. OPTIONAL.
                              ;SUPPLYING THIS SPEEDS SCREEN UPDATE.
                              ;N. B.  IF YOUR TERMINAL INSERTS BELOW THE
                              ;CURSOR LINE, PUT A "CURSOR UP" BEFORE THE
                              ;"INSERT LINE" CHARACTER(S).

Ø27B    ØØ     Ø2 1645  LININS: DB Ø        ;PUT LENGTH HERE
Ø27C    ØØ ØØ ØØ ØØ           DB Ø,Ø,Ø,Ø ;SPACE FOR 1-8 CHARACTERTS
Ø28Ø    ØØ ØØ ØØ ØØ           DB Ø,Ø,Ø,Ø
```

```
                                      ;TURN ON HIGHLIGHTING (INVERSE VIDEO, BRIGHT/DIM, OR
                                      ;OTHER MEANS OF HIGHLIGHTING A SECTION OF TEXT).
                                      ;APPLICABLE ONLY IF MEMAPV (NEXT PAGE) IS Ø. OPTIONAL.

Ø284    ØØ                    IVON:    DB Ø            ;LENGTH
Ø285    ØØ ØØ ØØ                       DB Ø,Ø,Ø        ;UP TO 6 CHARACTERS
Ø288    ØØ ØØ ØØ                       DB Ø,Ø,Ø

                                      ;TURN OFF HIGLHLIGHTING. OPTIONAL.
                                      ;IF NO STRING PATCHED IN, IVON STRING WILL BE
                                      ;USED TO TURN OFF AS WELL AS ON.

Ø28B    ØØ                    IVOFF:   DB Ø            ;LENGTH
Ø28C    ØØ ØØ ØØ                       DB Ø,Ø,Ø        ;UP TO 6 CHARACTERS
Ø28F    ØØ ØØ ØØ                       DB Ø,Ø,Ø

                                      ;TERMINAL INITIALIZATION STRING: ANY BYTES YOU
                                      ;WANT SENT TO YOUR TERMINAL AT BEGINNING OF
                                      ;SESSION. OPTIONAL. SEE ALSO INISUB, NEXT PAGE.
Ø292    ØØ                    TRMINI:  DB Ø            ;LENGTH
Ø293    ØØ ØØ ØØ ØØ                    DB Ø,Ø,Ø,Ø      ;THE BYTES,
Ø297    ØØ ØØ ØØ ØØ                    DB Ø,Ø,Ø,Ø      ;MAX LENGTH 8.

                                      ;ANY BYTES YOU WANT SENT TO TERMINAL AT END OF
                                      ;SESSION.  OPTIONAL. SEE ALSO UNISUB
Ø29B    ØØ                    TRMUNI:  DB Ø            ;LENGTH
Ø29C    ØØ ØØ ØØ ØØ                    DB Ø,Ø,Ø,Ø      ;THE BYTES,
Ø2AØ    ØØ ØØ ØØ ØØ                    DB Ø,Ø,Ø,Ø      ;UP TO 8.

                                      ;
                                      ;USER-PATCHABLE INITIALIZATION SUBROUTINE. CALLED
                                      ;JUST BEFORE TRMINI (PREVIOUS PAGE) IS SENT, THIS
                                      ;SUBROUTINE MAY BE USED FOR SPECIAL CONSOLE INIT-
                                      ;IALIZATION OR OTHER PURPOSES.
                                      ;
Ø2A4    ØØ                    INISUB:  NOP             ;ENTRY POINT. PUT DESIRED CODE IN
Ø2A5    ØØ                             NOP             ;"MORPAT" AREA (3 PAGES AHEAD IN
Ø2A6    C9                             RET             ;THIS LISTING) AND PATCH IN A "JMP"
                                                       ;INSTRUCTION HERE.  FOR YET MORE
                                                       ;SPACE, SEE "PBGMEM" ON SAME PAGE.
                                      ;
                                      ;USER-PATCHABLE DE-INITIALIZATION SUBROUTINE.
                                      ;CALLED AT EXIT (JUST BEFORE TRMUNI IS SENT),
                                      ;THIS SUBROUTINE MAY BE USED TO "UNDO" ANY SPECIAL
                                      ;TERMINAL STATUS USED IN THE EDITOR.
                                      ;
Ø2A7    ØØ                    UNISUB:  NOP             ;PUT DESIRED CODE IN
Ø2A8    ØØ                             NOP             ;"MORPAT" AREA, PATCH IN
Ø2A9    C9                             RET             ;A "JMP" HERE.

                                      ;
```

```
                              ;
                              ; MISCELLANEOUS TERMINAL-RELATED ITEMS
                              ;

                              ;FLAG TO PERMIT DISPLAY IN LAST COLUMN OF LAST LINE.
                              ;INITIALLY DISABLED, AS MANY TERMINALS SCROLL SCREEN
                              ; WHEN A CHARACTER IS DISPLAYED IN THIS POSITION.

Ø2AA    ØØ                    USELST: DB Ø   ;PATCH NON-Ø TO PERMIT LAST CHAR ON LAST
                                             ;LINE TO DISPLAY IF THIS WILL NOT SCROLL
                                             ;SCREEN OF YOUR TERMINAL. NORMALLY LEAVE Ø
                                             ;FOR USE WITH TERMINAL, PATCH NON-Ø
                                             ;FOR USE WITH MEMORY-MAPPED VIDEO BOARD.


Ø2AB    ØØ ØØ ØØ                     DB Ø,Ø,Ø        ;BYTES RESERVED FOR EXPANSION

                              ;
                              ;DELAYS EXECUTED AFTER VARIOUS TERMINAL FUNCTIONS,
                              ;BEFORE NEXT CHAR IS SENT TO TERMINAL, TO ALLOW RESPONSE
                              ;TIME REQUIRED BY CERTAIN TERMINALS WHEN USED AT HIGH
                              ;BAUD RATES.  PATCH LARGER IF YOU EXPERIENCE, FOR
                              ;EXAMPLE, LOSS OF CHARACTERS AFTER CURSOR POSITIONING.
                              ;EACH DELAY IS APPROX NUMBER OF MILLISECONDS ON
                              ;4 MHZ Z-8Ø; DELAY IS ABOUT TWICE AS LONG ON 2 MHZ 8Ø8Ø.
                              ;
Ø2AE    ØA                    DELCUS: DB 1Ø   ;1Ø+ MSEC DELAY AFTER CURSOR SET
Ø2AF    Ø5                    DELMIS: DB 5    ;5+ MSEC DELAY AFTER OTHER FUNCTIONS
```

```
                                    ;
                                    ;
                                    ; PROVISIONS FOR MEMORY-MAPPED VIDEO BOARDS THAT MEET
                                    ; THE FOLLOWING RESTRICTIONS:
                                    ;
                                    ; 1.  CHARACTERS POSITIONS APPEAR AS MEMORY LOCATIONS
                                    ;     AT SEQUENTIAL INCREASING ADDRESSES FROM A BASE.
                                    ; 2.  HIGHLIGHTING, IF USED, IS INVOKED BY SETTING
                                    ;     HIGH ORDER BIT OF CHARACTER.
                                    ; 3.  BOARD MUST ALWAYS BE "MAPPED IN" TO THE ADDRESS
                                    ;     SPACE, OR IT MUST BE SWITCHABLE IN AT AN ADDRESS
                                    ;     ABOVE APPROX 8000 HEX AND ROUTINES MUST BE PATCHED
                                    ;     IN AT "SWIN" AND "SWOUT" ON PAGE 12 OR SO BELOW.
                                    ;
                                    ; IF MEMAPV IS NON-ZERO, WORDSTAR WILL STORE DIRECTLY
                                    ; INTO YOUR VIDEO BOARD RATHER THAN DOING CONSOLE OUTPUT
                                    ; VIA CP/M.  THIS IS THE BEST INSTALLATION METHOD FOR
                                    ; VIDEO BOARDS MEETING THE RESTRICTIONS.
                                    ;
                                    ; FOR INSTALLATION SUGGESTIONS FOR OTHER VIDEO BOARDS,
                                    ; SEE DISCUSSION NEAR END OF THIS LISTING OR IN MANUAL.
                                    ;
 02B0     00                        MEMAPV: DB 0   ;NON-0 TO USE MEMORY-MAPPED VIDEO DISPLAY
                                                   ;DISPLAY BY DIRECT STORAGE METHOD.
 02B1     0000                      MEMADR: DW 0   ;ADDRESS OF VIDEO SCREEN RAM, TOP LINE,
                                                   ;LEFTMOST COLUMN.  THE REST OF THE SCREEN
                                                   ;MUST BE AT CONTIGUOUS ASCENDING ADDRESSES.
                                    ; WHEN USING MEMAPV, CHECK THE FOLLOWING ITEMS BELOW:
                                    ; HIBIV:  NON-0 FOR HIGH-BIT HILITING (DETAILS BELOW)
                                    ; HIBCUR: NON-0 FOR HIGH-BIT CURSOR
                                    ; CRBLIV: NON-0 TO BLINK CURSOR IF ON HILIGHTED CHAR
                                    ; SWIN, SWOUT: ROUTINES TO SWITCH VIDEO BOARD INTO
                                    ;                 AND OUT OF ADDRESS SPACE, IF NEEDED
                                    ; SETTING USELST ABOVE IS ALSO RECOMMENDED.
```

```
                                ;
                                ;FLAG TO SAY INVERSE VIDEO, HIGH BRIGHTNESS, OR OTHER
                                ;MEANS OF HIGHLIGHTING CHARACTER WILL OCCUR IF HIGH
                                ;ORDER BIT OF CONSOLE OUTPUT CHARACTER IS ON.
                                ;    INTENDED PRIMARILY FOR USE WHEN MEMAPV IS NON-ZERO
                                ;    (SEE IVON/IVOFF ABOVE FOR HILITING ON TERMINALS);
                                ;    BUT MIGHT ALSO BE USEFUL WITH CUSTOM CONSOLE OUTPUT
                                ;    ROUTINE (UCONO, BELOW).
                                ;
02B3    00              HIBIV:  DB 0     ;PATCH NON-0 IF YOU HAVE INVERSE
                                         ;VIDEO ETC. INVOKED BY HI ORDER BIT.


                                ;
                                ;FLAG TO INVOKE DISPLAY OF CURSOR ON MEMORY MAPPED
                                ;VIDEO BOARD BY SETTING HIGH ORDER BIT OF CHARACTER
                                ;UNDER CURSOR, RATHER THAN BY SENDING A CURSOR POSI-
                                ;TIONING STRING UNDER CONTROL OF THE PATCH ITEMS ON
                                ;PAGES 3 AND 4.
                                ;    THIS SAVES TIME AND ELIMINATES INTERACTION PROBLEMS
                                ;    THAT CAN ARISE IF CHARACTER DISPLAY IS BY DIRECT
                                ;    STORAGE BUT CURSOR POSITIONING IS VIA THE EXTERNAL
                                ;    BOARD DRIVER.
                                ;NOTE: CURSOR POSITION PATCHES SHOULD STILL BE INSTALLED
                                ;    TO INTERFACE TO EXTERNAL CURSOR POSITION FUNCTION;
                                ;    IT IS USED AT STARTUP AND EXIT TO PLACE INTERNAL AND
                                ;    EXTERNAL CURSORS IN SAME PLACE.
                                ;
02B4    00              HIBCUR: DB 0     ;NON-0 TO DISPLAY CRSR BY SETTING
                                         ;HIGH ORDER BIT OF CHARACTER.
                                         ;APPLICABLE IF MEMAPV, ABOVE, IS NON-0.


                                ;
                                ;FLAG TO SAY CURSOR MUST BE BLINKED BY THE EDITOR
                                ;IN ORDER TO BE VISIBLE WHEN ON OR ADJACENT TO AN
                                ;INVERSE VIDEO (OR OTHERWISE HIGHLIGHTED)
                                ;CHARACTER.  THIS SHOULD BE 0FFH IF YOUR CURSOR
                                ;IS NOT VISUALLY DISTINCT FROM YOUR INVERSE VIDEO
                                ;AND INVERSE VIDEO IS USED (VIA IVON/IVOFF OR HIBIV).
                                ;NORMALLY NEEDED WITH MEMORY MAPPED VIDEO BOARDS
                                ;WITH HIBIV AND HIBCUR BOTH 0FFH.
                                ;APPLICABLE TO BOTH TERMINALS AND VIDEO BOARDS.
                                ;BLINK METHOD USED FOR A TERMINAL: ALTERNATELY
                                ;SEND IVON, IVOFF STRINGS, WITH DELAYS.
                                ;
02B5    00              CRBLIV: DB 0     ;FF HEX FOR EDITOR TO BLINK CURSOR
                                         ;WHEN ON INVERSE VIDEO CHARACTER.


                        ; SEE ALSO SWIN, SWOUT -- 3 PAGES AHEAD
```

```
                    ; TWO SCHEMES FOR CIRCUMVENTING OPERATING SYSTEMS
                    ; THAT BACKSPACE WHEN "DELETE" IS INPUT.
                    ;
                    ;        A NUMBER OF PROPRIETARY VERSIONS OF CP/M
                    ;OUTPUT BACKSPACE, SPACE, BACKSPACE IN PLACE OF THE
                    ;THE NEXT CHARACTER OUTPUT AFTER A "DELETE" (RUBOUT)
                    ;IS INPUT.  THE CODE TO DO THIS IS IN THE "BIOS"
                    ;SECTION OF YOUR SYSTEM.
                    ;        THE INTENT OF THIS "FEATURE" IS TO MAKE THE
                    ;"DELETE" KEY ERASE A CHARACTER ON THE SCREEN,
                    ;INSTEAD OF ECHOING THE DELETED CHARACTER, DURING
                    ;SYSTEM COMMAND LINE INPUT.
                    ; UNFORTUNATELY, THIS "FEATURE" CAUSES A MESS ON THE SCREEN AFTER
                    ; THE DELETE KEY IS PRESSED IN WordStar, BECAUSE THE CHARACTER THAT
                    ; YOUR SYSTEM REPLACES WITH BACKSPACE-SPACE-BACKSPACE IS USUALLY
                    ; THE FIRST CHARACTER OF A CURSOR POSITIONING SEQUENCE BEING
                    ; OUTPUT BY WordStar.
                    ;
                    ; THE "DELETE-BACKSPACE" FEATURE THUS MUST BE DISABLED
                    ; DURING WordStar OPERATION; TWO METHODS ARE:
                    ;
                    ;   1. BY REFERRING TO YOUR "BIOS" LISTING IN YOUR
                    ;      SYSTEM DOCUMENTATION, INIDENTIFY THE LOCATION
                    ;      IN WHICH YOUR OPERATING SYSTEM SAVES THE LAST
                    ;      CHARACTER INPUT IN ORDER TO TEST FOR "DELETE"
                    ;      ON OUTPUT.  IN SOME SYSTEMS, THIS IS LOCATION 4F.
                    ;      PATCH THIS ADDRESS, LOW ORDER BYTE FIRST, INTO
                    ;      "ZAFCIN" BELOW.
                    ;
                    ;   2. PATCH "RUBFXF" BELOW TO NON-ZERO.  THE CONTENTS
                    ;      OF "RFIXER" WILL THEN BE OUTPUT IMMEDIATELY
                    ;      AFTER A "DELETE" IS INPUT; THIS CHARACTER, RATHER
                    ;      THAN THE NEXT CURSOR POSITITIONING STRING, SHOULD
                    ;      THUS BE REPLACED WITH BACKSPACE-SPACE-BACKSPACE,
                    ;      REDUCING THE CONSEQUENCES OF YOUR SYSTEM'S
                    ;      MACHINATIONS.  TRY NULL (ZERO) IN RFIXER FIRST;
                    ;      IF THIS DOESN'T WORK, TRY BACKSPACE (08) OR SPACE.
                    ;
02B6    0000        ZAFCIN: DW 0    ;ZERO OR POINTER TO LOCATION TO ZERO
                                    ; AFTER EACH KEYBOARD CHARACTER IS INPUT

02B8    00          RUBFXF: DB 0    ;NON-ZERO TO OUTPUT CHARACTER IN RFIXER
                                    ; AFTER EACH "DELETE" IS INPUT.
02B9    00          RFIXER: DB 0    ;CHARACTER TO OUTPUT AFTER EACH "DELETE"
                                    ; IS INPUT IF "RUBFXF" IS NON-0.
```

```
                                ;
                                ; OPTIONAL USER-SUPPLIED CONSOLE I/O SUBROUTINES. USER MAY
                                ; PATCH JMP'S HERE TO HIS OWN CONSOLE INPUT, OUTPUT, AND
                                ; STATUS ROUTINES, IN WHICH CASE THESE ROUTINES INSTEAD OF
                                ; THE OPERATING SYSTEM "BIOS" ENTRY POINTS WILL BE USED FOR
                                ; ALL CONSOLE I/O (EXCEPT I/O TO PRINTER INSTALLED AS ALTER-
                                ; NATE CONSOLE).  THESE ROUTINES MAY ALTER ALL REGISTERS.
                                ;

                                ; OPTIONAL USER CONSOLE CHARACTER READY ROUTINE
  02BA    00            UCNSTA: NOP       ;NORMALLY 0, OR JUMP TO YOUR OWN STATUS
  02BB    00                    NOP       ;SUBROUTINE.  MUST RETURN 0 IN A
  02BC    C9                    RET       ;IF NO CHAR READY, 0FFH IF CHAR IS READY.

                                ; OPTIONAL USER CONSOLE INPUT ROUTINE
  02BD    00            UCONI:  NOP       ;NORMALLY 0, OR JMP TO YOU OWN INPUT
  02BE    00                    NOP       ;SUBROUTINE. MUST RETURN CHARACTER IN A.
  02BF    C9                    RET       ;MAY BE CALLED BEFORE CHARACTER IS READY.
                                          ;IF NO CHARACTER IS READY, ROUTINE MUST
                                          ; WAIT UNTIL CHARACTER IS AVAILABLE.

                                ; OPTIONAL USER CONSOLE OUTPUT ROUTINE
                                  ;USE OF A CUSTOM ROUTINE ACCESSED HERE IS SUGGESTED,
                                  ;FOR EXAMPLE, TO DRIVE A VIDEO BOARD THAT CANNOT BE
                                  ;DRIVEN VIA OUTPUT TO OPERATING SYSTEM AND WHICH DOES
                                  ;NOT MEET RESTRICTIONS FOR USE OF "MEMAPV" ABOVE.

  02C0    00            UCONO:  NOP       ;NORMALLY 0, ELSE JMP TO YOUR OWN CONSOLE
  02C1    00                    NOP       ;OUTPUT SUBROUTINE.  SUBROUTINE RECIEVES
  02C2    C9                    RET       ;CHARACTER IN A; IF HI-BIT HILITING IS IN
                                          ;USE ("HIBIV" SET ABOVE), HI ORDER BIT
                                          ;WILL BE ON IF CHAR SHOULD BE HILITED.

                                  ;UCONO ALSO RECEIVES: L=LINE # ON SCREEN, H=COLUMN #,
                                  ; DE=# BYTES FROM BEGINNING OF SCREEN TO CHARACTER
                                  ; POSITION (0=TOP LEFT), BC=# BYTES FROM BEGINNING
                                  ; OF SCREEN TO BEGINNING OF CURRENT LINE

                                  ;UCONO ROUTINE MUST HANDLE THE FOLLOWING CHARACTERS:
                                  ; ASCII PRINTING CHARACTERS 20H THRU 7EH: DISPLAY CHAR,
                                  ;     ADVANCE CURSOR TO NEXT POSITION. HI ORDER BIT WILL
                                  ;     BE 1 FOR HILIGHTED CHARS IF HIBIV, ABOVE, IS NZ.
                                  ; CR (0DH):   POSITION CURSOR AT BEGINNING OF SAME LINE
                                  ; LF (0AH):   MOVE CURSOR DOWN ONE LINE; OR, IF ALREADY
                                  ;             ON BOTTOM LINE OF SCREEN, SCROLL SCREEN
                                  ;             UP ONE LINE.
                                  ; PLUS ALL CONTROL SEQUENCES GENERATED BY CURSOR PATCH
                                  ; ITEMS ABOVE (UNLESS A CURSOR SUBROUTINE (UCRPOS) IS
                                  ; USED) AND OPTIONAL PATCH ITEMS ERAEOL, LINDEL, LININS,
                                  ; IVON, IVOFF, TRMINI, AND TRMUNI ABOVE.
```

```
                                ;
                                ; PROVISIONS TO SWITCH A MEMORY MAPPED VIDEO BOARD INTO
                                ; AND OUT OF THE ADDRESS SPACE.
                                ;      MOST VIDEO BOARDS ALWAYS APPEAR IN MEMORY. HOWEVER,
                                ; CERTAIN BOARDS MUST BE "SWITCHED IN" TO BE ACCESSED AND
                                ; "SWITCHED OUT" WHEN NOT BEING STORED INTO, SO THAT
                                ; SYSTEM ROM OR RAM AT THE SAME ADDRESSES MAY BE ACCESSED.
                                ;      IF YOU HAVE A VIDEO BOARD THAT REQUIRES "SWITCHING
                                ; IN" AND "SWITCHING OUT", THE BOARD MAY BE ACCESSED ON A
                                ; DIRECT MEMORY MAPPED BASIS BY WORDSTAR WITHOUT LOSS OF
                                ; USE OF MEMORY AT THE SAME ADDRESSES IF SUITABLE ROUTINES
                                ; ARE INSTALLED FOR "SWIN" AND "SWOUT" BELOW.
                                ;      WHEN SWITCHED IN, THE ADDRESSES OCCUPIED BY THE
                                ; BOARD MUST NOT CONFLICT WITH WORDSTAR'S CODE, THAT IS,
                                ; THE BOARD MUST APPEAR AT OR ABOVE ABOUT 8000 HEX.
                                ; THE BOARD MAY, HOWEVER, APPEAR AT THE SAME ADDRESSES
                                ; AS THE OPERATING SYSTEM.
                                ;      SEE "MEMAPV" AND OTHER ITEMS BEGINNING ON PAGE 8
                                ; OR SO FOR OTHER ASPECTS OF INSTALLATION FOR DIRECT
                                ; MEMORY ACCESS TO A VIDEO BOARD.
                                ;      SIX BYTES OF SPACE IS PROVIDED FOR EACH ROUTINE
                                ; BELOW. IF ROUTINE IS LONGER, PATCH IN A JMP TO A ROUTINE
                                ; AT MORPAT OR ELSEWHERE.  YOUR ROUTINES MUST PRESERVE ALL
                                ; REGISTERS EXCEPT THE PSW.  WHEN NO ROUTINE IS PRESENT,
                                ; "NOP, NOP, RET" SHOULD BE LEFT IN THE PATCH ITEM.
                                ; NO ROUTINES SHOULD BE INSTALLED EXCEPT WHEN A VIDEO
                                ; BOARD IS BEING USED ON A DIRECT MEMORY MAPPED BASIS.
                                ;
                                ; OPTIONAL ROUTINE CALLED BY WORDSTAR BEFORE EACH
                                ; DIRECT MEMORY MAPPED ACCESS TO A VIDEO BOARD.
                                ; THIS ROUTINE MAY SWITCH THE VIDEO BOARD INTO THE
                                ; ADDRESS SPACE, POSSIBLY DISPLACING PART OF THE
                                ; SYSTEM'S RAM OR ROM ABOVE ABOUT 8000 HEX.
                                ; ROUTINE MUST PRESERVE CONTENTS OF B,C,D,E,H, AND L.
   02C3    00            SWIN:   NOP              ;NORMALLY NOP, NOP, RET, OR
   02C4    00                    NOP              ;SWITCH-IN ROUTINE OF 6 BYTES
   02C5    C9                    RET              ;OR LESS, OR JMP TO LONGER
   02C6    00 00 00              DB 0,0,0         ;ROUTINE.


                                ; OPTIONAL ROUTINE CALLED BY WORDSTAR AFTER EACH
                                ; DIRECT MEMORY MAPPED ACCESS TO A VIDEO BOARD.
                                ; THIS ROUTINE MAY SWITCH THE VIDEO BOARD OUT OF
                                ; THE ADDRESS SPACE, TO ALLOW SUBSEQUENT ACCESS
                                ; TO ANY RAM OR ROM THE VIDEO BOARD DISPLACED.
                                ; ROUTINE MUST PRESERVE THE B,C,D,E,H, AND L REGISTERS.
   02C9    00            SWOUT:  NOP              ;NORMALLY NOP, NOP, RET, OR
   02CA    00                    NOP              ;SWITCH-OUT ROUTINE OF 6 BYTES
   02CB    C9                    RET              ;OR LESS, OR JMP TO LONGER
   02CC    00 00 00              DB 0,0,0         ;ROUTINE.
                                ;
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                                    ;
                                    ; DELAYS FOR CURSOR BLINK, "NEW FILE" MESSAGE, ETC.
                                    ;
                                    ; THE FOLLOWING DELAYS MAY BE ALTERED TO ADJUST FOR
                                    ; VARIATIONS IN CPU SPEED AND FOR INDIVIDUAL PREFERANCES.
                                    ; EACH OF THE FOLLOWING FOUR ITEMS MAY BE SET TO VALUES
                                    ; BETWEEN 1 (MINIMUM DELAY) AND 127 (MAXIMUM DELAY).
                                    ; IT IS SUGGESTED THAT YOU RETAIN THE APPROXIMATE
                                    ; RELATIVE PROPORTIONS OF THE DELAYS.

02CF    03          DEL1:   DB 3      ;CONTROLS SHORT DELAY. USES INCLUDE:
                                    ; CURSOR BLINK (WHEN ON HILIGHTED CHAR AND CRBLIV
                                    ;         ABOVE IS NON-ZERO): "ON" PORTION OF CYCLE.
                                    ; CURSOR BLINK BETWEEN "REPLACE Y/N:" IN STATUS
                                    ;         LINE AND FILE DISPLAY DURING REPLACE
                                    ;         COMMAND (^QA): TIME IN FILE DISPLAY AREA.

02D0    09          DEL2:   DB 9      ;CONTROLS MEDIUM-SHORT DELAY. USES INCLUDE:
                                    ; CURSOR BLINK (WHEN ON HILIGHTED CHAR AND CRBLIV
                                    ;         ABOVE IS NON-ZERO): "OFF" PORTION OF CYCLE.
                                    ; CURSOR BLINK BETWEEN "REPLACE Y/N:" IN STATUS
                                    ;         LINE AND FILE DISPLAY DURING REPLACE
                                    ;         COMMAND (^QA): TIME IN STATUS LINE.

02D1    19          DEL3:   DB 25     ;CONTROLS MEDIUM-LONG DELAY. USES INCLUDE:
                                    ; TIME FROM HITTING A PREFIX KEY TIL
                                    ;             PREFIX MENU IS DISPLAYED.
                                    ; DELAY AT A "FILE NAME?", ETC. QUESTION BEFORE
                                    ;             DISPLAY OF QUESTION SPECIAL CHARACTERS MENU.

02D2    40          DEL4:   DB 64     ;CONTROLS LONG DELAY: USES INCLUDE:
                                    ; TIME SIGNON REMAINS ON SCREEN.
                                    ; TIME "NEW FILE" MESSAGE REMAINS ON SCREEN.
                                    ; TIME "ABANDON" MESSAGE REMAINS DISPLAYED.
                                    ; TIME TO WAIT FOR FULL SCREEN REFRESH DURING
                                    ; HORIZONTAL SCROLLING

02D3    09          DEL5:   DB 9      ;CONTROLS DELAY USED FOR A FULL SCREEN
                                    ; REDISPLAY DURING HORIZONTAL SCROLLING. IT IS
                                    ; THE AMOUNT OF TIME TO WAIT AFTER A KEYSTROKE
                                    ; TO REFRESH THE SCREEN.
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                                 ;
                                 ; ITEMS FOR NON-STANDARD VERSIONS OF WORDSTAR.
                                 ; THESE ITEMS ADDED IN WORDSTAR 2.20.
                                 ;
02D4      00                     TRSCRS: DB 0      ;USED ONLY IN TRS-80 MODEL 1 WORDSTAR,
                                                   ;INOPERATIVE IN NORMAL WORDSTAR.
                                                   ;SET 0FFH TO USE SPECIAL CURSOR DRIVER.

02D5      00                     TRSCIF: DB 0      ;USED ONLY FOR TRS-80 MODEL I WORDSTAR,
                                                   ;INOPERATIVE IN NORMAL WORDSTAR.
                                                   ;SET TO 0FFH FOR SPECIAL KEYBOARD DRIVERS

02D6      00                     HETHBS: DB 0      ;USED ONLY FOR HEATH89 WITH LIFEBOAT
                                                   ;CP/M 1.42 & 1.43. INOPERATIVE IN NORMAL
                                                   ;WORDSTAR. SET TO 0FFH TO ALLOW WORDSTAR
                                                   ;TO PATCH BIOS TO ELIVIATE BS, SPACE, BS
                                                   ;PROBLEM WHEN RUBOUT IS ENTERED

02D7      00                     APLFLG: DB 0      ;USED ONLY FOR THE APPLE VERSION OF WORDSTAR
                                                   ;SET BY INSTALL, NO NEED FOR USERS TO CHANGE

02D8      01 01                  NMOFUS: DB 1,1    ;THE # OF USERS ON THE SYSTEM. NORMALLY 1
                                                   ;SET TO A HIGHER VALUE IF WORDSTAR SPENDS
                                                   ;TOO MUCH TIME POLLING CSTAT, CAUSING THE
                                                   ;SYSTEM TO SLOW DOWN. SHOULD ONLY BE USED
                                                   ;IF THE OPERATING SYSTEM CAN BUFFER KEY-
                                                   ;BOARD CHARACTERS.

02DA      00                     TCKFLG: DB 0      ;SET TO 0FFH IF UNDER MP/M & SYSTEM CALL 141
                                                   ;CAN BE USED FOR A DELAY. THE VAUES OF DEL1,
                                                   ;ETC. MAY HAVE TO BE CHANGED TO CORRESPOND
                                                   ;TO THE AMOUNT OF TIME ALLOCATED PER TICK.
                                                   ;THIS SAVES CPU TIME IN A MULTIPROCESSING
                                                   ;ENVIRONMENT

02DB      00                     RSTFLG: DB 0      ;SET TO NON-ZERO IF A DISK RESET SHOULD NEVER
                                                   ;BE ISSUED MANY VERSIONS OF MP/M DO NOT ALLOW
                                                   ;FOR DISK RESETS THIS WILL FIX THE MP/M ERROR
                                                   ;MESSAGE THAT MAY OCCUR

02DC      01                     DEFDSK: DB 1      ;THE DEFAULT DISK DRIVE TO TEST FOR WSMSGS,
                                                   ;WSOVLY1.OVR, ETC. IF THE NECCESARY FILE IS
                                                   ;NOT ON THE LOGGED ON DISK DRIVE PRESENTLY
                                                   ;SET TO TEST THE A: DRIVE. SET 2=B:, 3=C:, ETC.

02DD      14                     SCRLSZ: DB 20     ;# OF SCREEN POSITIONS TO HORIZONTAL SCROLL
                                                   ;AT A TIME PRESENTLY SET TO 20, ADJUST IF YOU
                                                   ;WANT SCREEN TO SCROLL MORE OR FEWER SCREEN
                                                   ;POSITIONS
```

```
;
;  DISCUSSION OF MEMORY-MAPPED VIDEO BOARD INSTALLATION
;

;1. THE SIMPLEST INSTALLATION METHOD IS TO ACCESS THE BOARD
;   THROUGH THE OPERATING SYSTEM, AS THOUGH IT WERE A TER-
;   MINAL.  THIS REQUIRES, OF COURSE, THAT CURSOR CAN BE
;   POSITIONED BY OUTPUTTING A CHAR SEQUENCE.  ONLY THOSE
;   OPTIONAL FEATURES (LINE INSERT, ERASE END LINE, ETC.)
;   THAT CAN BE INVOKED VIA CHAR SEQUENCES MAY BE USED.
;
;2. MEMAPV/MEMADR (SEE PAGE 8 OR SO): FOR BOARDS THAT MEET
;   THE RESTRICTIONS (SEE PAGE 8), THIS METHOD IS BEST FOR
;   SPEED, MEMORY UTILIZATION, AND BECUASE ERASE TO END
;   LINE, LINE INSERT, AND LINE DELETE FUNCTIONS ARE
;   IMPLICITLY AVAILABLE WITH NO INSTALLATION CONSIDERATION.
;
;3. BOARDS THAT DO NOT MEET THE MEMAPV/MEMADR RESTRICTIONS:
;
;  A. ACCESS AS A TERMINAL IF PRACTICABLE - ITEM 1
;
;  B. BOARDS THAT CANNOT BE ACCESSED AS A TERMINAL (E.G.
;     BECUASE CURSOR POSITIONING OR SOME DESIRED OPTIONAL
;     FEATURE NOT ACCESSIBLE THROUGH OPERATING SYSTEM) AND
;     FOR WHICH MEMAPV/MEMADR CANNOT BE USED (E.G. BECAUSE
;     HIGHLIGHTING IS DESIRED AND IT IS NOT INVOKED BY
;     HIGH ORDER BIT OF CHARACTER, OR BECAUSE CHARACTER
;     POSITIONS DO NOT APPEAR AT CONTIGUOUS INCREASING
;     MEMORY ADDRESSES): YOU MUST CODE YOUR OWN DRIVER.
;
;  SUGGESTIONS FOR CODING YOUR OWN VIDEO BOARD DRIVER:
;
;     BUILD THE DRIVER AROUND A CUSTOM CHARACTER OUTPUT
;SUBROUTINE ACCESSED VIA THE "UCONO" ITEM.  THIS ROUTINE
;WILL RECEIVE THE ASCII CHARACTER CODES 2ØH-7EH (WHICH IT
;MUST DISPLAY), THE CONTROL CHARACTERS CARRIAGE RETURN AND
;LINE FEED, WHICH IT MUST PROPERLY INTERPRET, AND OTHER
;CONTROL CHARACTERS PER YOUR PATCHES IN THE CURSOR POSI-
;TIONING ITEMS AND OTHER TERMINAL ITEMS, AS USED.  NOTE
;THAT UCONO RECEIVES ADDITIONAL USEFUL INFO IN BCDEHL.
;     CURSOR POSITIONING MAY BE BY CHARACTER SEQUENCE (USE
;CURSOR PATCH ITEMS AS FOR A TERMINAL, PAGE 3, AND INTER-
;PRET THE CHAR SEQUENCE IN YOUR UCONO ROUTINE, OR BY
;CUSTOM SUBROUTINE (UCRPOS, PAGE 4. READ COMMENTS WITH
;WITH UCRPOS RE USEFUL INFO IN REGISTERS CAREFULLY!).
;     HIGHLIGHTING MAY BE INVOKED BY HIGH ORDER BIT ON
;EACH HILITED CHARACTER (HIBIV) OR BY CHAR SEQUENCES
;(IVON AND IVOFF, AND INTERPRET THE CHARS IN UCONO).
;     ERASE END LINE, LINE DELETE, AND LINE INSERT, IF IMP-
;LEMENTED, MUST BE INVOKED BY CHAR SEQUENCES PATCHED INTO
;ERAEOL, LINDEL, AND LININS AND INTERPRETED IN UCONO.
;     INITIALIZATION MAY BE DONE VIA TRMINI OR INISUB.
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```
02DE      ØØ ØØ                      DB Ø,Ø          ;SPACE RESERVED FOR EXPANSION
                                 ; SPACE FOR USER-ADDED SUBROUTINES
                                 ;
Ø2EØ                             MORPAT:
Ø2EØ      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø2E4      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø      ;ADDITIONAL SPACE THAT MAY
Ø2E8      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø      ;BE USED FOR USER PATCHES,
Ø2EC      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø      ;FOR EXAMPLE FOR A CURSOR
Ø2FØ      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø      ;POSITIONING SUBROUTINE, OR
Ø2F4      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø      ;FOR "INISUB" OR "UNISUB"
Ø2F8      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø      ;SUBROUTINES.
Ø2FC      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø      ;FOR YET MORE SPACE,
Ø3ØØ      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø      ;SPACE, SEE "PBGMEM", NEXT.
Ø3Ø4      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø3Ø8      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø3ØC      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø31Ø      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø314      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø318      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø31C      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø32Ø      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø324      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø328      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø32C      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø33Ø      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø334      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø338      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø33C      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø34Ø      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø344      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø348      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø34C      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø35Ø      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø354      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
Ø358      ØØ ØØ ØØ ØØ                DB Ø,Ø,Ø,Ø
```

```
                                    ;
                                    ; PROVISION FOR EXTENDED PATCHING
                                    ;
                                    ;PBGMEM POINTS TO BEGINNING OF MEMORY TO USE FOR WORK-
                                    ;ING STORAGE. IF YET MORE SPACE IS NEEDED FOR PATCHES,
                                    ;INSTALL FIRST, THEN PUT YOUR ADDED CODE WHERE PBGMEM
                                    ;POINTS AND INCREASE PBGMEM TO POINT BEYOND YOUR PATCHES.
                                    ;BE SURE TO USE A LARGE ENOUGH "SAVE" COMMAND!
                                    ; — SAVE SIZE REQUIRED IS much LARGER THAN FOR WS.COM
                                    ;WITHOUT ADDED PATCHES!

035C    0000*              PBGMEM: DW MEMORY    ; An indefinite amount of code may
                                                ; be added here AFTER INSTALLation.
                                                ; Do not add code before INSTALLing,
                                                ; as INSTALL will delete it!
                                    ;
                                    ; ** END TERMINAL MODIFICATION AREA **

035E                       ALABEL  EQU    $        ;ASSEMBLER SHOULD PRINT 35E

                                   END      ;NEXT MODULE LOADS AT LOCATION 360 HEX
```

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Macros:

Symbols:
ALABEL	Ø35E	APLFLG	Ø2D7I	ASCUR	Ø26ØI	CB4LFG	Ø25DI
CLEAD1	Ø24AI	CLEAD2	Ø253I	COLOFF	Ø25FI	CRBLIV	Ø2B5I
CTRAIL	Ø258I	DEFDSK	Ø2DCI	DEL1	Ø2CFI	DEL2	Ø2DØI
DEL3	Ø2D1I	DEL4	Ø2D2I	DEL5	Ø2D3I	DELCUS	Ø2AEI
DELMIS	Ø2AFI	ERAEOL	Ø26DI	HETHBS	Ø2D6I	HIBCUR	Ø2B4I
HIBIV	Ø2B3I	HITE	Ø248I	INISUB	Ø2A4I	IVOFF	Ø28BI
IVON	Ø284I	LINDEL	Ø274I	LININS	Ø27BI	LINOFF	Ø25EI
MEMADR	Ø2B1I	MEMAPV	Ø2BØI	MEMORY	Ø35C*	MORPAT	Ø2EØI
NMOFUS	Ø2D8I	OUTCHR	Ø267*	PBGMEM	Ø35CI	RFIXER	Ø2B9I
RSTFLG	Ø2DBI	RUBFXF	Ø2B8I	SCRLSZ	Ø2DDI	SWIN	Ø2C3I
SWOUT	Ø2C9I	TBASE	Ø1ØØ	TCKFLG	Ø2DAI	TRMINI	Ø292I
TRMUNI	Ø29BI	TRSCIF	Ø2D5I	TRSCRS	Ø2D4I	UCNSTA	Ø2BAI
UCONI	Ø2BDI	UCONO	Ø2CØI	UCRPOS	Ø264I	UNISUB	Ø2A7I
USELST	Ø2AAI	WID	Ø249I	ZAFCIN	Ø2B6I		

No   Fatal error(s)

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Appendix F
The Printer Patch Area (USER4)

A listing of the WordStar user-modifiable module USER4 follows this page.
This assembly listing is supplied for the convenience of the occasional user
who may need to install WordStar for an unusual terminal or printer. Note that
this listing is for the standard TBASE=100 Hex version. For the TRS-80 Model I
version, and the Heath 89 version origined at 4300 Hex, add 4200 Hex to all
addresses shown in listings. For a discussion of this listing, see Sections 6-
8.

A separate publication, WordStar Customization Notes, is directed towards OEM's
and system programmers. The Customization Notes contain additional source
listings, including:

   o   default areas

   o   message files

   o   OEM daisy wheel and similar printer drivers.

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```
                    TITLE USER4  Ø4/1Ø/81 PRINTER PATCH AREA
        ;
        ; FOR WordStar RELEASE 3.Ø MAY, 1981
        ;
        ;ITEMS IN THIS FILE ARE NORMALLY SET AS REQUIRED BY THE
        ;INSTALL PROGRAM, OR USED WITHOUT CHANGE.
        ;
        ;THERE IS NORMALLY NO NEED TO REFER TO THIS LISTING IN
        ;ORDER TO MAKE WORDSTAR OPERATIONAL, AS THE INSTALL
        ;PROGRAM WILL SET ESSENTIAL ITEMS AS REQUIRED
        ;FOR ALL NORMAL INSTALLATIONS.
        ;
        ;MODIFICATIONS SOME USERS MAY WISH TO MAKE IN ITEMS
        ;LISTED HERE INCLUDE:
        ;
        ;  1.   ADDING CONTROL SEQUENCES FOR A TELETYPE-LIKE (NON-
        ;       DAISY) PRINTER TO SUPPORT ADDITIONAL FEATURES, E.G.:
        ;                 CHARACTER PITCH CHANGE
        ;                 RIBBON COLOR CHANGE
        ;                 PARTIAL LINE MOTION (FOR SUBSCRIPTS).
        ;
        ;  2.   MODIFYING OR ADDING TO THE DRIVER CODE USED TO
        ;       SEND CHARACTERS TO AND FROM THE PRINTER, FOR THE
        ;       FOLLOWING OR OTHER REASONS, IN CASES WHERE
        ;       WORDSTAR'S PORT DRIVER (WHICH CAN BE FULLY SET UP
        ;       BY ANSWERING INSTALL'S QUESTIONS) CANNOT BE USED.
        ;                 A)  ALLOW RECEIVING CHARACTERS FROM PRINTER,
        ;                     FOR PRINTERS WHICH REQUIRE ETX/ACK
        ;                     PROTOCOL TO OPERATE AT MAXIMUM BAUD RATE;
        ;                 B)  ALLOW WORDSTAR TO DETERMINE IF PRINTER IS
        ;                     READY TO RECEIVE A CHARACTER, FOR BETTER
        ;                     PERFORMANCE IN CONCURRENT PRINTING;
        ;                 C)  INSTALLING A CUSTOM DRIVER FOR PRINTER NOT
        ;                     SUPPORTED BY USER'S OPERATING SYSTEM NOR
        ;                     SUPPORTABLE WITH WORDSTAR'S PORT DRIVER.
        ;
                    PAGE 63          ;SETS PAGE LENGTH
```

```
                              ; ENTRIES

                              ENTRY POSMTH,BLDSTR,DBLSTR,PSCRLF,PSCR,PSHALF,PBACKS
                              ENTRY PALT,PSTD,ROLUP,ROLDOW, RIBBON,RIBOFF
                              ENTRY USR1,USR2,USR3,USR4
                              ENTRY PSINIT,PSFINI, SOCHR,ULCHR
                              ENTRY PRINIT,PRFINI, CSWTCH,HAVBSY
                              ENTRY LIBSY,LISEND,LISINP, POBSY,POSEND,POINP
                              ENTRY POSTAT,POMASK,POOM,POOP,POINSK,POIM,PISTAT,POIP
                              ENTRY PUBSY,PUSEND,PUINP
                              ENTRY ACBSY,ACSEND,ACINP,ACFIN,ACSTA1,ACSTAR,CONFIE
                              ENTRY PROTCL,EAKBSZ

                              ; EQUATES

0100                          TBASE EQU 100H   ;WHERE PROGRAM IS LOADED FOR NORMAL CP/M

0000'                           ASEG   ;ABSOLUTE CODE, FOR USER LISTING

                                ORG TBASE+590H           ;BEGINS AFTER END OF USER3


0003                          IOBYTE EQU TBASE-100H+3 ;LOCATION OF SYTEM I/O
                                              ;ASSIGNMENTS STATUS BYTE, USED BY
                                              ;ALTERNATE CONSOLE PRINTER DRIVER.

0005                          BDOS EQU TBASE-100H+5    ;BDOS SYSTEM CALL ENTRY POINT,
                                              ;USED IN CP/M LIST DEVICE PRINTER DRIVER.

0005                          LISTF EQU 5      ;CP/M LIST OUTPUT SYSTEM CALL FUNCTION #,
                                              ;USED BY CP/M LIST DEVICE PRINTER DRIVER.

0008                          BS     EQU    8      ;BACKSPACE CHARACTER
000A                          LF     EQU    10     ;LINE FEED
000C                          FF     EQU    12     ;FORM FEED
000D                          CR     EQU    13     ;CARRIAGE RETURN
007F                          DEL    EQU    7FH    ;DELETE OR RUBOUT
```

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                                    ;ITEMS RELATING TO ALL PRINTERS
                        ;
                        ; PRINTER CHARACTERISTICS AND PRINTING METHOD
                        ;
                          ;PRINTER TYPE / OVERSTRIKE METHOD **** VERY
                          ; IMPORTANT: DETERMINES METHOD OF DOUBLE
                          ; STRIKE, UNDERLINE, ETC, AND WHETHER DAISY-
                          ; LIKE PRINTER CAPABLE OF MICROSPACE JUSTIFY.

                          ;POSMTH=FF HEX:
                          ;   PRINTER CAN OVERPRINT ONLY BY CARRIAGE
                          ;   RETURN WITHOUT LINE FEED.
                          ;POSMTH=0:
                          ;   PRINTER CAN OVERPRINT BY BACKSPACING AS
                          ;   WELL AS BY CARRIAGE RETURNING.
                          ;   NOTE: WITH POSMTH=0, CR-OVERPRINT IS USED
                          ;   ONLY FOR OVERPRINT LINES IN FILE. FOR
                          ;   PRINTERS THAT CAN BACKSPACE BUT NOT RETURN
                          ;   CARRIAGE WITHOUT LINE FEED (EG SELECTRIC),
                          ;   USE POSMTH=0 AND DON'T USE OVERPRINT LINES.
                          ;POSMTH=1:
                          ;   PRINTER IS A DAISY WHEEL OR SIMILAR INCRE-
                          ;   MENTAL PRINTER. CAN PRINT WITHOUT SPACING;
                          ;   CAN SPACE AND ROLL IN SMALL INCREMENTS.
                          ;   MICROJUSTIFICATION OCCURS ONLY IF POSMTH=1.
                          ;   ADDITIONAL PATCH ITEMS IN USER5.MAC ARE SET
                          ;   BY THE INSTALL PROGRAM FOR DAISIES.

0690   01   POSMTH: DB 1H
                                    ;FF SEND CR THEN ANOTHER WHOLE LINE
                                    ;00 SEND BACKSPACE THEN CHAR TO
                                    ;   PRINT OVER LAST CHAR SENT
                                    ;01 DIASY WHEEL PRINTER WITH ALL NECESS
                                    ;   ITEMS IN USER4 AND USER5 INSTALLED.

0691   02   BLDSTR: DB 2   ;NUMBER OF STRIKES FOR "BOLDFACE"
                                    ;SET 3, 4, 5, ETC FOR DARKER "BOLDFACE"
                                    ;ON NON-DAISY PRINTER. FOR DIASY
                                    ;PRINTERS, 2 IS USED - DON'T CHANGE.

0692   02   DBLSTR: DB 2   ;NUMBER OF STRIKES FOR "DOUBLE
                                    ;STRIKE". INCREASE AS DESIRED.

0693   00 00 00   DB 0,0,0   ;RESERVED

```
                              ; ******* USER-PATCHABLE FUNCTION
                              ; STRINGS FOR NON-DAISY PRINTERS ********

                              ;EACH STRING CONSISTS OF THE NUMBER OF BYTES,
                              ;FOLLOWED BY THE BYTES TO BE SENT.
                              ;IF FUNCTION IS NOT AVAILABLE,
                              ;NUMBER OF BYTES SHOULD BE ZERO.

                              ;   ITEMS ON NEXT N PAGES APPLY ONLY WHEN
                              ;   POSMTH (ABOVE) IS Ø OR FF, NOT 1.

                              ;
                              ;STRING TO ADVANCE TO NEXT LINE, USED WHEN
                              ;CR,LF ENCOUNTERED IN FILE.
                              ;
                              ;   IF YOUR PRINTER REQUIRES NULLS SENT
                              ;   AFTER CARRIAGE RETURN (FOR DELAY),
                              ;   INCREASE COUNT SO SOME OF
                              ;   FOLLOWING ZEROES ARE SENT.
                              ;
                              ;   IF YOUR PRINTER AUTO LINE-FEEDS AFTER
                              ;   CR CODE, REMOVE LF.  (IF POSSIBLE,
                              ;   TURN OFF AUTO-LF IN YOUR PRINTER
                              ;   INSTEAD, FOR GREATER FLEXIBILY OF
                              ;   WORDSTAR USE).
                              ;
Ø696    Ø2                    PSCRLF: DB 2   ;NUMBER OF CHARACTERS
Ø697    ØD                            DB CR  ;1ST CHAR: CARR RET
Ø698    ØA                            DB LF  ;2ND CHAR: LINE FEED
Ø699    ØØ ØØ ØØ ØØ                    DB Ø,Ø,Ø,Ø    ;SPACE FOR 8
Ø69D    ØØ ØØ ØØ ØØ                    DB Ø,Ø,Ø,Ø    ;..MORE CHARS


                              ;
                              ;STRING TO RETURN CARRIAGE TO BEGINNING
                              ;OF SAME LINE, TO OVERPRINT.
                              ;
                              ;USED FOR UNDERLINE, DOUBLE STRIKE, ETC IF
                              ; POSMTH (ABOVE) IS FF.
                              ;AND WHEN CR WITHOUT LF IS ENCOUNTERED
                              ; IN FILE IF POSMTH IS FF OR Ø.
                              ;ALSO USED WHEN POSMTH IS FF AND BACKSPACE
                              ; (^H) IS ENCOUNTERED IN FILE.
                              ;
Ø6A1    Ø2                    PSCR:   DB 2   ;2 CHARS: CR AND A NULL,
                                             ;TO ALLOW A LITTLE TIME
                                             ;FOR CERTAIN PRINTERS.
Ø6A2    ØD                            DB CR  ;CARRIAGE RETURN
Ø6A3    ØØ                            DB Ø   ;NULL, FOR DELAY
Ø6A4    ØØ ØØ ØØ ØØ                    DB Ø,Ø,Ø,Ø    ;SPACE FOR 4
                                             ;MORE CHARS.
```

```
                                    ;NON-DAISY STRINGS...
                              ;
                              ; STRING TO DO CARRIAGE RETURN AND HALF LINE
                              ; FEED, FOR PRINTERS THAT CAN DO HALF LINE FEED
                              ; DOWNWARD BUT NOT UPWARD.  USED TO PRINT
                              ; SUBSCRIPTS AND SUPERSCRIPTS AT HALF-LINE
                              ; INTERVALS IF ROLUP (BELOW) NOT INSTALLED
                              ; AND POSMTH IS FF OR 0.
                              ;
                              ; FOR EXAMPLE, FOR A SELECTRIC THAT ALWAYS
                              ; FEEDS HALF LINES, INSTALL ONE CRLF HERE,
                              ; TWO IN "PSCRLF" ABOVE.
                              ;
06A8    00                    PSHALF: DB 0
06A9    00 00 00 00                  DB 0,0,0,0,0,0
06AD    00 00

                              ;
                              ;STRING TO BACKSPACE, IE TO OVERPRINT LAST
                              ;CHAR PRINTED.
                              ;
                              ;USED FOR UNDERLINE, DOUBLE STRIKE, ETC IF
                              ;POSMTH (ABOVE) IS 0.  ALSO USED WHEN BACKSPACE
                              ;(^H) ENCOUNTERED IN FILE IF POSMTH IS 0.
                              ;
06AF    01                    PBACKS: DB 1
06B0    08                            DB BS          ;ASCII BACKSPACE
06B1    00 00 00 00                  DB 0,0,0,0
```

```
                                    ;NON-DAISY STRINGS...

                                    ;  **** THE FOLLOWING ARE OPTIONAL
                                    ;      STRINGS, PERMITTING USE OF ADDITIONAL
                                    ;      FEATURES IF SUPPORTED BY YOUR PRINTER.
                                    ;
                                    ;STRING TO SET ALTERNATE CHARACTER
                                    ;WIDTH, IF AVAILABLE.
                                    ;
   06B5    00                       PALT:   DB 0    ;0 CHARS: NOT AVAILABLE
   06B6    00 00 00 00                      DB 0,0,0,0
                                    ;
                                    ;STRING TO RESET TO STANDARD CHARACTER WIDTH
                                    ;
   06BA    00 00 00 00              PSTD:   DB 0,0,0,0,0
   06BE    00

                                    ;
                                    ;STRING TO ROLL CARRIAGE UP A PARTIAL LINE
                                    ; WITHOUT ALTERING CARRIAGE COLUMN,
                                    ; IF AVAILABLE, FOR USE BEFORE SUPERSCRIPT
                                    ; AND AFTER SUBSCRIPT.  ROLDOW SHOULD ALSO
                                    ; BE INSTALLED TO ROLL CARRIAGE SAME AMOUNT
                                    ; IN OTHER DIRECTION. APPLIES IF POSMTH=FF OR 0.
                                    ;
   06BF    00 00 00 00              ROLUP:  DB 0,0,0,0,0
   06C3    00

                                    ;
                                    ;STRING TO ROLL DOWN, AS AFTER SUPERSCRIPT,
                                    ; IF AVAILABLE.  USED ONLY IF ROLUP ALSO
                                    ; INSTALLED.
                                    ;
   06C4    00 00 00 00              ROLDOW: DB 0,0,0,0,0
   06C8    00

                                    ; ****** USER-PATCHABLE ITEMS FOR BOTH
                                    ;       BOTH DAISY AND NON-DAISY PRINTERS  ********
                                    ;
                                    ; STRINGS FOR USER-DEFINED FUNCTIONS 1-4, INVOKABLE
                                    ; WITH PRINT CONTROL CHARACTERS IMBEDDED IN FILE.
                                    ;   USE ONLY WITH EXTREME CAUTION AND VERY THOROUGH
                                    ; TESTING ON DAISY PRINTERS, AS WORDSTAR'S CONTROL
                                    ; SEQUENCES AND YOURS COULD EASILY INTERFERE.
                                    ;    LINES CONTAINING CONTROLS THAT INVOKE THESE
                                    ; ALWAYS PRINT FORWARD EVEN IF BIDIRECTION PRINT IS ON.
                                    ;
   06C9    00                       USR1:   DB 0
   06CA    00 00 00 00                      DB 0,0,0,0
   06CE    00                       USR2:   DB 0
   06CF    00 00 00 00                      DB 0,0,0,0
   06D3    00                       USR3:   DB 0
   06D4    00 00 00 00                      DB 0,0,0,0
   06D8    00                       USR4:   DB 0
   06D9    00 00 00 00                      DB 0,0,0,0
```

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                              ;DAISY / NON-DAISY ITEMS...

                         ;STRINGS USED BY BOTH DIASIES AND NON-DAISIES.
                         ;AUTOMATICALLY PATCHED FOR DAISIES BY INSTALL PROGRAM;
                         ;MEDDLE WITH CAUTION FOR DAISY PRINTERS.
                         ;
                         ; CHANGE RIBBON COLOR (OPTIONAL)
                         ;
    06DD   00   RIBBON: DB 0   ;CHANGE TO ALTERNATE COLOR
    06DE   00 00 00 00   DB 0,0,0,0

    06E2   00   RIBOFF: DB 0   ;CHANGE BACK TO BLACK
    06E3   00 00 00 00   DB 0,0,0,0
                         ;
                         ; STRING TO INITIALIZE PRINTER. SENT AT
                         ; START OF PRINTING, MAY BE USED TO TURN MOTOR
                         ; ON, SET STANDARD CHARACTER SIZE AND LINE
                         ; HEIGHT, OR OTHER FUNCTIONS FOR YOUR SPECIFIC
                         ; HARDWARE. ALWAYS PATCHED BY INSTALL PROGRAM,
                         ; ADD YOUR BYTES AFTER INSTALLATION.
                         ;
    06E7   01   PSINIT: DB 1   ;NUMBER OF CHARACTERS
    06E8   0D   DB CR   ;CARRIAGE RETURN, TO MAKE SURE
                                         ;CARRIAGE STARTS AT LEFT EDGE
                                         ;OF PAPER.
    06E9   00 00 00   DB 0,0,0
    06EC   00 00 00 00   DB 0,0,0,0   ;UP TO 16 CHARACTERS ..
    06F0   00 00 00 00   DB 0,0,0,0   ;.. TOTAL TO SEND ..
    06F4   00 00 00 00   DB 0,0,0,0   ;.. TO PRINTER
                         ;
                         ; STRING SENT TO PRINTER AT CONCLUSION OF
                         ; PRINTING, EG TO TURN MOTOR OFF.
                         ;
    06F8   00   PSFINI: DB 0
    06F9   00 00 00 00   DB 0,0,0,0
    06FD   00 00 00 00   DB 0,0,0,0
    0701   00 00 00 00   DB 0,0,0,0
    0705   00 00 00 00   DB 0,0,0,0   ;UP TO 16 CHARS

    0709   00 00   DB 0,0   ;RESERVED

                         ;
                         ; CHARACTER USED FOR "STRIKEOUT" PRINT ENHANCEMENT
                         ;   (INVOKED WITH CONTROL-X PRINT CONTROL)
    070B   2D   SOCHR: DB '-'
                         ;
                         ; CHARACTER USED FOR "UNDERSCORE" PRINT ENHANCEMENT
                         ;   (INVOKED WITH CONTROL-S PRINT CONTROL)
    070C   5F   ULCHR: DB '_'

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```
                                    ;
                                    ; CUSTOM PRINTER INITIALIZE SUBR, CALLED BEFORE
                                    ; STRING (PSINIT OR DINIT) IS SENT.  USE FOR
                                    ; ANYTHING THAT CAN'T BE ACCOMPLISHED WITH
                                    ; A STRING, SUCH AS ASSIGNMENT OR INITIALIZING
                                    ; A SPECIAL DRIVER INSTALLED IN YOUR BIOS.
                                    ;
070D    00                 PRINIT: NOP     ;INITIALLY NULL. PATCH A JMP
070E    00                         NOP     ;TO YOUR ROUTINE HERE. SEE END
070F    C9                         RET     ;OF USER1.MAC RE FINDING PATCH
                                            ;SPACE.
                                    ;
                                    ; CUSTOM PRINTER FINISH (CLOSE) SUBR, CALLED
                                    ; AFTER STRING (PSFINI OR DFINI) IS SENT.
                                    ;
0710    00                 PRFINI: NOP
0711    00                         NOP
0712    C9                         RET

0713    00 00 00 00                DB 0,0,0,0      ;RESERVED
```

```
                            ;  *****  FLAGS RELATING TO TRANSMISSION
                            ;           OF CHARACTERS TO PRINTER  *****

                            ;ITEMS ON THIS PAGE RELATE TO ALL PRINTERS.


0717    03                  CSWTCH: DB 3    ;WHERE TO SEND EACH OUTPUT CHARACTER:
                              ; 00  TO CP/M LIST DEVICE.
                              ;   HAVBSY SHOULD BE 0 (UNLESS YOU
                              ;   INSTALL A "BUSY" ROUTINE AT LIBSY)
                              ; 01  TO INSTALL-PROGRAM-PATCHABLE PORT DRIVER
                              ; 02  TO USER SUBROUTINE, ENTRY POINTS
                              ;   PUBUSY, PUSEND, AND PUINP.
                              ; 03  TO OEM DAISY PRINTER DRIVER. FORCES POSMTH=1.
                              ; 04  TO ALTERNATE CONSOLE PRINTER DRIVER.


0718    FF                  HAVBSY: DB 0FFH ;NON-ZERO IF PRINTER DRIVER
                                      ; AS INSTALLED AND PATCHED
                              ; HAS A "BUSY" TEST SEPARATE FROM
                              ; "PRINT A CHARACTER".  IF NON-ZERO,
                              ; CONCURRENT EDITING AND PRINTING
                              ; WILL PERFORM BETTER; MUST BE ZERO
                              ; IF CAN'T FIND OUT WHETHER PRINTER
                              ; IS BUSY (AS WHEN CHARACTERS ARE
                              ; OUTPUT THROUGH CP/M "LIST" DEVICE).

0719    00                          DB 0    ;RESERVED FOR EXPANSION
```

```
                            ;  *****  PRINTER DRIVERS PER SE *****

                            ; THERE ARE FIVE DRIVERS, CORRESPONDING TO
                            ; CSWTCH (PREVIOUS PAGE) = 00, 01, 02, 03, 04.
                            ;
                            ; EACH OF THE DRIVERS HAS THREE ENTRIES:
                            ;  1.  BUSY STATUS ENTRY.  RETURNS CY=1 IF
                            ;        PRINTER IS NOT READY.  IF UNIMPLEMENTED,
                            ;        RETURN CY=0.  HAVBSY SHOULD BE 0 IF
                            ;        UNIMPLEMENTED AND FF IF IMPLEMENTED.
                            ;  2.  SEND CHARACTER (A REGISTER) ENTRY.
                            ;  3.  INPUT A CHAR TO A, OR RETURN CY=1 IF NO
                            ;        INPUT CHARACTER READY.  THIS ENTRY IS
                            ;        USED ONLY FOR ETX/ACK AND XON/XOFF
                            ;        BUFFER FULL PROTOCOLS IMPLEMENTED
                            ;        WITHIN EDITOR (SEE "PROTCL" BELOW).
                            ;
                            ; THESE ROUTINES MAY CLOBBER ALL REGISTERS.


                            ;
                            ;PRINTER DRIVER TO OUTPUT TO CP/M LIST
                            ;DEVICE. ONLY CALLED IF CSWITCH=00.
                            ;
071A            LIBSY:  ;BUSY TEST ENTRY - BUSY TEST MAY BE
                            ;ADDED HERE IF YOUR OPERATING SYSTEM
                            ;ALLOWS DETERMINING WHETHER PRINTER
                            ;IS READY. PATCH HAVBSY TO FF IF USED.

071A    00                  NOP
071B    B7                  ORA A          ;RETURN CY=0 TO SAY
071C    C9                  RET            ; .. NOT BUSY.

071D            LISEND: ;OUTPUT CHARACTER (A) TO LIST DEVICE

071D    5F                  MOV E,A        ;CHARACTER IN E FOR CP/M
071E    0E 05               MVI C,LISTF    ;FUNCTION # IN C
0720    CD 0005             CALL BDOS      ;CALL SYSTEM
0723    B7                  ORA A          ;CLEAR CY FLAG
0724    C9                  RET            ;RETURN TO CALLER

0725            LISINP: ;INPUT CHARACTER TO (A) OR RETURN CY=1
                            ;IF NONE.  THIS FUNCTION IS NOT SUPPLIED
                            ;BY OPERATING SYSTEM, USER MUST SUPPLY
                            ;SUBROUTINE IF ETX/ACK OR XON/XOFF
                            ;PROTOCOL IS TO BE USED.

0725    00                  NOP
0726    37                  STC    ;IF NO ROUTINE INSTALLED, SAY
0727    C9                  RET    ; .. NO CHARACTER READY.
```

```
                                    ; PRINTER DRIVERS...
                                    ;
                                    ;PORT DRIVER.  CALLED ONLY IF CSWITCH=1.
                                    ;
                                    ;    DOES I/O DIRECT TO HARDWARE PORTS.  PORT NUMBERS AND
                                    ;STATUS BITS MAY BE SET AS DESIRED BY ANSWERING QUESTIONS
                                    ;ASKED BY THE INSTALL PROGRAM AFTER CHOOSING "PORT DRIVER".
                                    ;    INITIALLY SET UP TO USE PORT 4 FOR DATA, PORT 5 BIT 0
                                    ;ON TO INDICATE READY FOR OUTPUT, PORT 5 BIT 1 ON TO
                                    ;INDICATE INPUT CHARACTER READY.
                                    ;    SELECTING PORT DRIVER IN INSTALL SETS HAVBSY TO FF.
                                    ;
  0728              POBSY:              ;PORT DRIVER STATUS ENTRY
                                    ;BUSY TEST CODE:
  0728     DB                         DB (IN)    ;"IN" INSTRUCTION
  0729     05      POSTAT: DB 5        ;PATCH OUTPUT STATUS PORT # HERE
  072A     00              NOP        ; - PORT 5 SHOWN AS EXAMPLE
  072B     E6              DB (ANI)   ;MASK BIT(S) OF INTEREST -
  072C     01      POMASK: DB 1        ; BIT 0 SHOWN AS EXAMPLE.
  072D     EE              DB (XRI)   ;COMPLEMENT BITS WHICH MUST
  072E     01      POOM:   DB 1        ; BE 1 FOR PRINTER READY.
                                    ;NOW HAVE NON-ZERO IF PRINTER NOT RDY
  072F     37              STC        ;SAY NOT READY
  0730     C0              RNZ        ;RETURN IF NOT READY
  0731     B7              ORA A      ;CLEAR CARRY: SAY READY
  0732     C9              RET        ;RETURN

  0733              POSEND:             ;PORT DRIVER SEND CHAR ENTRY
  0733     D3              DB (OUT)
  0734     04      POOP:   DB 4        ;OUTPUT DATA PORT PATCHED HERE -
  0735     00              NOP        ; PORT 4 SHOWN AS EXAMPLE.
  0736     C9              RET

  0737              POINP:              ;PORT DRIVER INPUT CHAR ENTRY,
                                    ;USED IF PROTCL=1 OR 2 ONLY.
  0737     DB              DB (IN)
  0738     05      PISTAT: DB 5        ;PATCH INPUT STATUS PORT # HERE
  0739     00              NOP
  073A     E6              DB (ANI)
  073B     02      POINSK: DB 2        ;MASK BITS OF INTEREST - B1 SHOWN
  073C     EE              DB (XRI)   ;COMPLEMENT BITS THAT ARE ON WHEN
  073D     02      POIM:   DB 2        ; INPUT CHARACTER IS READY
                                    ;NOW HAVE NZ IF INPUT CHARACTER NOT READY
  073E     37              STC
  073F     C0              RNZ        ;RETURN CY=1 IF NO CHAR READY
                                    ;CHARACTER IS READY, INPUT IT
  0740     DB              DB (IN)
  0741     04      POIP:   DB 4        ;PATCH INPUT DATA PORT # HERE
  0742     00              NOP
  0743     B7              ORA A      ;CLEAR CY
  0744     C9              RET        ;RETURN WITH CHAR IN A
```

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                                    ;PRINTER DRIVERS...

    0745   00 00 00 00   DB 0,0,0,0,0,0,0   ;RESERVED
    0749   00 00 00
                                    ;
                                    ;USER-SUPPLYABLE PRINTER OUTPUT SUBROUTINES
                                    ;CALLED ONLY IF CSWITCH=2.
                                    ;
                                    ; THIS MAY BE USED WHERE SPECIAL INTERFACE
                                    ; REQUIREMENTS NECESSITATE A MORE COMPLEX
                                    ; ROUTINE THAN THE PORT DRIVER ABOVE.
                                    ;
                                    ; SPACE IS PROVIDED HERE ONLY FOR THE JMPS TO
                                    ; THE ROUTINES; PATCH OVER DRIVERS ABOVE, OR
                                    ; IN "MORPAT" AREA AT END OF USER1 MODULE
                                    ; (SEE PRECEDING LISTING). FOR MORE SPACE,
                                    ; SEE "PBGMEN" AND ASSOCIATED COMMENTS AT
                                    ; END OF USER1 LISTING.
                                    ;
    074C   00   PUBSY: NOP   ;ENTRY POINT TO USER-SUPPLIED
                                            ; ROUTINE TO RETURN CY=1 IF
                                            ; PRINTER IS NOT READY.
    074D   B7   ORA A   ;IF UNIMPLEMENTED, RET CY=0.
    074E   C9   RET

    074F   00   PUSEND: NOP   ;ENTRY POINT TO USER-SUPPLIED
    0750   00   NOP   ; ROUTINE TO PRINT CHARACTER
    0751   C9   RET   ; IN A REGISTER.

    0752   00   PUINP: NOP   ;ENTRY POINT TO USER-SUPPLIED
                                            ; ROUTINE TO INPUT CHARACTER,
                                            ; OR RETURN CY=1 IF NONE READY.
                                            ; USED ONLY IF PROTCL IS 1 OR 2.
    0753   37   STC   ;IF UNIMPLEMENTED, SAY NO CHAR RDY.
    0754   C9   RET

                            ; THE PRINTER DRIVER FOR CSWTCH=3 IS NOT IN USER4.

    0755   00 00 00   DB 0,0,0   ;RESERVED

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```
                                        ;PRINTER DRIVERS...
                                ;
                                ; "ALTERNATE CONSOLE" PRINTER DRIVER
                                ;       CALLED ONLY IF CSWTCH=4.
                                ;
                                ; THIS DRIVER ALLOWS ACCESS TO PRINTERS REQUIRING
                                ; CHARACTER INPUT (FOR A COMMUNICATIONS PROTOCOL)
                                ; WITHOUT PATCHING IN A DRIVER, UNDER OPERATING
                                ; SYSTEMS WHICH SUPPORT MULTIPLE CONSOLES SELECTED
                                ; VIA THE "IOBYTE" I/O ASSIGNMENTS BYTE.
                                ;
                                ; THIS DRIVER IS SELECTED BY SETTING CSWTCH TO 4.
                                ;
                                ; THE SPECIFIC CONSOLE DEVICE TO BE USED IS SELECTED
                                ; BY SETTING ITEM "CONFIE" BELOW TO 00, 01, 02, OR 03.
                                ;
                                ; "HAVBSY" SHOULD BE 0 WHEN USING ALTERNATE CONSOLE
                                ; DRIVER, UNLESS YOU ADD A BUSY TEST ROUTINE.
                                ;
0758                            ACBSY:  ;ENTRY POINT FOR OUPUT BUSY TEST.
                                        ;NO ROUTINE SUPPLIED, AS NORMAL OPERATING SYSTEM
                                        ; DOES NOT PROVIDE CONSOLE OUTPUT BUSY FUNCTION.
0758    00                              NOP
0759    B7                              ORA A    ;RETURN CY=0 TO SAY "NOT BUSY"
075A    C9                              RET


075B                            ACSEND: ;ENTRY POINT TO SEND CHARACTER IN A TO PRINTER

075B    CD 0777                         CALL ACSTAR    ;SET IOBYTE TO ALTERNATE CONSOLE,
                                                       ;SAVING ORIGINAL IOBYTE IN B.
075E    CD 0000*                        CALL COUCH##   ;OUTPUT CHARACTER (A) TO CONSOLE,
                                                       ;PRESERVING REGISTERS.
0761    C3 076E                         JMP ACFIN      ;GO RESTORE IOBYTE AND RETURN.


0764                            ACINP:  ;ENTRY POINT TO RETURN CONSOLE INPUT CHARACTER
                                        ;IN A REGISTER, OR RETURN CY=1 IF NO CHAR READY.

0764    CD 0777                         CALL ACSTAR    ;SAVE AND SET IOBYTE
0767    CD 0000*                        CALL CONSTA##  ;THIS SUBROUTINE RETURNS 0 IN
                                                       ;A AND Z FLAG SET IF NO CHARACTER
                                                       ;IS READY AT CONSOLE. SAVES BCDEHL.
076A    C4 0000*                        CNZ INCHR##    ;IF CHARACTER READY, GET IT TO A.
                                                       ;ELSE 0 IS LEFT IN A.
076D    57                              MOV D,A        ;PUT VALUE TO RETURN IN D FOR NOW
                                        ;FALL THRU TO ACFIN ON NEXT PAGE TO RESTORE IOBYTE,
                                        ;RETURN D IN A, CY=1 IF NO CHAR READY, ELSE CY=0.
```

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                                      ;PRINTER DRIVERS...   ALTERNATE CONSOLE DRIVER...


```
076E                         ACFIN:   ;ALTERNATE CONSOLE DRIVER COMMON EXIT ROUTINE

076E    78                            MOV A,B       ;ORIGINAL IOBYTE, SAVED BY "ACSTAR"
076F                         ACSTA1:          ;"ACSTAR" SUBROUTINE JOINS HERE
076F    32 0003                       STA IOBYTE    ;SET NEW IOBYTE OR RESTORE ORIGINAL
0772    7A                            MOV A,D       ;RESTORE A REGISTER
                                      ;RETURN CY=1 IF A=0: THIS IS NEEDED AT EXIT FROM
                                      ;"ACINP" ROUTINE, DOES NO HARM IN OTHER CASES.
0773    B7                            ORA A         ;TEST FOR NON-ZERO, CLEAR CY FLAG
0774    C0                            RNZ           ;IF NON-ZERO, RETURN CY FLAG CLEAR
0775    37                            STC           ;ELSE SET CARRY FLAG
0776    C9                            RET           ;FOR A=0 RETURN CY=1


0777                         ACSTAR: ;COMMON ENTRY SUBR FOR ALTERNATE CONSOLE DRIVER

0777    57                            MOV D,A       ;SAVE A IN D, FOR ACSEND.
0778    3A 0003                       LDA IOBYTE    ;GET I/O ASSIGNMENTS STATUS BYTE
077B    47                            MOV B,A       ;SAVE INITIAL IOBYTE IN B
077C    E6 FC                         ANI 0FCH      ;ZERO THE "CONSOLE" PART OF IOBYTE
077E    F6                            DB (ORI)      ;SET DESIRED CONSOLE BITS
077F    01                   CONFIE:  DB 01  ;USER OR INSTALLATION SETS DESIRED
                                             ;CONSOLE BITS HERE:
                                                    ; 00 = TTY: PHYSICAL DEVICE
                                                    ; 01 = CRT: PHYSICAL DEVICE
                                                    ; 02 = BAT: PHYSICAL DEVICE
                                                    ; 03 = UC1: PHYSICAL DEVICE
                                      ; NEW IOBYTE VALUE IS NOW IN A
0780    C3 076F                       JMP ACSTA1    ;GO SET IOBYTE FROM A, RESTORE A
                                                    ;FROM D, AND RETURN TO CALLER.
```

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```
0783     00 00 00                    DB  0,0,0              ;RESERVED
                               ;
                               ; **** PRINTER COMMUNICATIONS PROTOCOL ****
                               ;
                               ; APPLICABLE IF CSWTCH=0, 1, OR 2.
                               ; APPLICABLE FOR ALL POSMTH VALUES.
                               ;
                               ; THREE BUFFER FULL PROTOCOLS ARE SUPPORTED:
                               ;
                               ; NO PROTOCOL: (PROTCL=0): NO PROTOCAL EXECUTED IN WORD-
                               ;    STAR: USE IF NONE REQUIRED OR IF HANDLED ELSEWHERE,
                               ;    EG IN OPERATING SYSTEM OR IN USER DRIVER ROUTINES.
                               ;
                               ; ETX/ACK PROTOCOL (PROTCL=1): WS TRANSMITS "ETX" AT END
                               ;    OF STRING OF CHARACTERS, PRINTER RESPONDS WITH
                               ;    "ACK" WHEN ALL OF THESE CHARACTERS HAVE BEEN
                               ;    PRINTED.  DRIVER MUST BE ABLE TO INPUT CHARACTERS.
                               ;
                               ; XON/XOFF PROTOCAL (PROTCL=2): PRINTER
                               ;    SENDS "XOFF" WHEN WS SHOULD STOP SENDING,
                               ;    "XON" WHEN TRANSMISSION SHOULD BE RESUMED.
                               ;    DRIVER MUST BE ABLE TO INPUT CHARACTERS.
                               ;
0786     00              PROTCL: DB  0     ;0=NO PRINTER BUFFER FULL PROTOCOL
                                           ;1=ETX/ACK PROTOCOL. SET EAKBSZ BELOW!
                                           ;2=XON/XOFF PROTOCOL
                               ; USE 0 FOR MOST TTY-LIKE PRINTERS AND FOR SERIAL
                               ; DAISY PRINTERS INTERFACED AT 300 BAUD OR SLOWER.
                               ; FOR DIABLO AND QUME AT 1200 BAUD, USE 1.
                               ; FOR NEC AT 1200 BAUD, USE 1 OR 2 AND CONFIGURE THE
                               ;  PRINTER APPROPRIATELY, OR USE 0 & CABLE ADAPTER.

0787     7F              EAKBSZ: DB  127   ;ETX/ACK MESSAGE LENGTH (1/2 PRINTER'S
                                           ;BUFFER SIZE), APPLICABLE ONLY IF PROTCL=1,
                                           ;AUTOMATICALLY PATCHED FOR DAISY PRINTERS.

0788     00 00                      DB  0,0       ;RESERVED FOR EXPANSION
078A     00 00 00 00                DB  0,0,0,0   ;RESERVED FOR EXPANSION

078E              ALABEL  EQU    $    ;ASSEMBLER SHOULD PRINT 78E

                               END              ;NEXT MODULE LOADS AT 790H
```

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Macros:

Symbols:

ACBSY	Ø758I	ACFIN	Ø76EI	ACINP	Ø764I	ACSEND	Ø75BI
ACSTA1	Ø76FI	ACSTAR	Ø777I	ALABEL	Ø78E	BDOS	ØØØ5
BLDSTR	Ø691I	BS	ØØØ8	CONFIE	Ø77FI	CONSTA	Ø768*
COUCH	Ø75F*	CR	ØØØD	CSWTCH	Ø717I	DBLSTR	Ø692I
DEL	ØØ7F	EAKBSZ	Ø787I	FF	ØØØC	HAVBSY	Ø718I
INCHR	Ø76B*	IOBYTE	ØØØ3	LF	ØØØA	LIBSY	Ø71AI
LISEND	Ø71DI	LISINP	Ø725I	LISTF	ØØØ5	PALT	Ø6B5I
PBACKS	Ø6AFI	PISTAT	Ø738I	POBSY	Ø728I	POIM	Ø73DI
POINP	Ø737I	POINSK	Ø73BI	POIP	Ø741I	POMASK	Ø72CI
POOM	Ø72EI	POOP	Ø734I	POSEND	Ø733I	POSMTH	Ø69ØI
POSTAT	Ø729I	PRFINI	Ø71ØI	PRINIT	Ø7ØDI	PROTCL	Ø786I
PSCR	Ø6A1I	PSCRLF	Ø696I	PSFINI	Ø6F8I	PSHALF	Ø6A8I
PSINIT	Ø6E7I	PSTD	Ø6BAI	PUBSY	Ø74CI	PUINP	Ø752I
PUSEND	Ø74FI	RIBBON	Ø6DDI	RIBOFF	Ø6E2I	ROLDOW	Ø6C4I
ROLUP	Ø6BFI	SOCHR	Ø7ØBI	TBASE	Ø1ØØ	ULCHR	Ø7ØCI
USR1	Ø6C9I	USR2	Ø6CEI	USR3	Ø6D3I	USR4	Ø6D8I

No Fatal error(s)

MicroPro

INTERNATIONAL CORPORATION

WORDSTAR
WITH MAILMERGE & SPELLSTAR

Section 3 : Reference Manual

W o r d S t a r

Reference Manual

WS-3550-1 (3.0)

First Issue: May 15, 1981

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INTRODUCTION

WordStar is a powerful, comprehensive word-processing system that is easy to learn and easy to use. Although WordStar has a wide range of functions and commands, its use at the keyboard is simplified by screen menus that may be varied for different levels of users. Even though this manual contains over a hundred pages of detailed explanations, this does not mean that WordStar is overly complex and difficult to learn. WordStar is a visual system which you must experience "in the cockpit," i.e., seated at your terminal. Nevertheless, every phase of WordStar has been carefully documented, along with recommended procedures for getting the most out of its features.

To begin your WordStar experience, sit at a terminal, look at the menus, and note the convenient keyboard layout. Look at the range of functions, enter some text, and then try manipulating it by by changing margins, substituting, and inserting. Read the manual, and try the operations on your terminal as you read. We hope you will enjoy WordStar as much as we've enjoyed putting it together.

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WordStar Release 3.0

This manual provides information current to WordStar Release 3.0. Specific features that have been added since Release 2.2 include the following:

Edit Function

Horizontal Scrolling: Documents wider than 80 columns can now be scrolled horizontally across the screen in either direction. You will be allowed to set margins up to 240 columns. (See Sections 2 and 3 for details.)

Column Move: A new command, ^KN, allows you to move, copy, or delete either **columns** of text or ordinary margin-to-margin blocks. The ^KN command acts as a toggle between column blocks and regular blocks and affects the way the other block commands work. (See Section 6 for details.)

New Menus: All menus have been re-designed for easier reading and better appearance. Although this re-design has been done mainly to accommodate smaller screen sizes, users of larger screen sizes will also benefit from it. Each menu will now contain more information, will display commands in related groups, and will display each group of commands in a more compact area of the screen. (See Sections 1 and 2 for details.)

A New WordStar Option

SpellStar: If you have purchased this WordStar option, a new "no-file" command, S, allows you to check the spelling of words in a document. Initially, you are allowed to check against a dictionary of some 20,000 words provided by SpellStar; but with continued use of this feature, you can then either add to the existing dictionary or create new dictionaries of your own. (See Sections 1 and 13 for details.)

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Section 1
Introduction

This section explains how to start WordStar and describes the commands available to you between editing tasks. The section covers everything you need to know before starting to enter documents with the editing function, as discussed in Section 2.

STARTING WORDSTAR

Prerequisites

Before you can call up WordStar, you must

- Have a diskette containing a copy of WordStar "installed" to work with your terminal and printer. The installed WordStar consists of three files (described in the **General Information Manual**):

    WS.COM (or other name chosen during installation)

    WSMSGS.OVR

    WSOVLY1.OVR

    If you or another person have not yet installed WordStar to work on your system, see the **Installation Manual.**

- Know how to turn on your computer and "boot" (cold-start) your CP/M operating system. Since these procedures depend on the computer and the version of CP/M, you will have to refer to other manuals.

To start WordStar, first boot your operating system (CP/M). When CP/M is ready, it will display the prompt "A>" (if A is the logged drive) or "B>" (if B is the logged drive). CP/M will also display this prompt any time you exit from Wordstar or whenever CP/M completes execution of a system command.

Calling Up WordStar

Once the system prompt "A>" appears, there are three ways to call up WordStar:

BASIC METHOD

At the system prompt "A>" type

        A>WS   RETURN

This starts WordStar with no file being edited; a copyright message appears for several seconds, then the no-file menu (as described below) is displayed. Example (you type underlined text):

        A>WS   RETURN

This basic method is sufficient for initial use; you may defer reading about the other two methods for now.

DIRECTLY TO EDITING

Type WS, a space, and the name of the file, including disk drive and type as appropriate. WordStar will proceed to editing this file, as though the "edit a document" command had been given from the no-file menu as described below. Examples (you type underlined text):

A>WS LETTER.DOC   RETURN

A>WS B:ABC.XYX   RETURN

DIRECTLY TO EDITING
ON ANOTHER DISK DRIVE

This method is for extremely long files, where the new file must be placed on a different diskette because of space limitations. Type WS, a space, the source drive name, the name of the file, another space, and the target drive name. (If the file is on the diskette in the drive currently logged, the source drive name may be omitted.) A drive name, if used, consists of a letter followed by a colon. Make sure you don't type anything after the target drive name, not even a space. Example (you type underlined text):

A>WS A:BOOK.DOC B: RETURN

This means, "Edit file BOOK.DOC on the diskette on drive A and place the new version on file BOOK.DOC on the diskette on drive B." When the save is completed, the file on the diskette on drive A will have been renamed BOOK.BAK, while the file on the diskette on drive B will now be called BOOK.DOC. If you use a "save and resume" command (^KS), the next editing session will result in a save from B to A, the following session from A to B again, and so on.

Note

If, when you call up WordStar, you get the message

You are trying to run an unINSTALLed WordStar.
Please run INSTALL first.

then your WordStar has not yet been installed to work with your terminal and printer. Refer to the **Installation Manual** for information on installation.

THE NO-FILE COMMANDS

When started without a file name, or whenever editing of a file is terminated, WordStar displays the "no-file menu". The words "editing no file" are displayed at the top of the screen, and a "menu" of commands that may be entered is shown. Below the menu, WordStar displays the directory (the names of all files on the diskette) of the logged drive if the file directory display is ON. Figure 1-1 shows a typical screen display with the no-file menu:

```
        < < <  N O - F I L E   M E N U  > > >
*  * * Preliminary Commands * *  * |*  File  Commands  *|* System Commands *
L  Change logged disk drive       |  P  Print  a file  |R Run a  program
F  File directory     off (ON)    |  E  Rename a file  |X Exit to system
H  Set help level                 |  O  Copy  a  file  |
*  * Commands to Open a File *   *|  Y  Delete a file  |* WordStar Options *
   D  Open a  document  file      |                    |M Run MailMerge
   N  Open a non-document file    |                    |S Run SpellStar ▉

DIRECTORY of disk A:
 CHAPTR1.DOC  CHAPTR1.BAK   CHAPTR2.DOC   CHAPTR2.BAK   CHAPTR3.DOC   CHAPTR3.BAK
 CONTENTS.DOC CONTENTS.BAK  FILE1.DOC     FILE1.BAK     FILE2.DOC     FILE2.BAK
 LETTER.DOC   LETTER.BAK    TEXT1.DOC     TEXT1.BAK     TEXT2.DOC     TEXT2.BAK
 MAILMRGE.OVR WS.COM        WSMSGS.OVR    WSOVLY1.OVR
```

Figure 1-1. Screen Showing No-file Menu

To perform one of the functions shown on the no-file menu, enter the single
letter shown for that function. The letter may be entered in upper or lower
case, or with the CTRL key depressed. Unrecognized characters are ignored.
No RETURN or other key is used after the command letter. When a command is
entered, the letter is displayed in the upper left hand corner of the screen
and further action is taken depending on the command.

THE PRELIMINARY COMMANDS

Table 1-1 gives brief descriptions of the preliminary commands, followed by
detailed descriptions in later paragraphs.

Table 1-1. Preliminary Commands

Command	Description
L	**Change Logged Disk Drive.** Displays the name of the current logged disk drive and allows selection of a new logged disk drive. Use L to allow display of directory of a different drive, or for convenience before working with files on a different drive.
F	**File Directory Toggle.** Controls display of file directory (names of all files on diskette in logged disk drive). The first F command turns the directory display off, the second F turns the directory display on again, etc. To display the directory of a different drive, change the logged disk with the L command.
H	**Set Help Level.** Asks for the new "help level" (0 to 3), which determines the degree of menu display and other prompting supplied by WordStar. Unless the help level is already 0, an explanation of the help levels is displayed.

Change Logged Disk Drive (the L Command)

The L command allows changing the logged disk drive. (The "logged disk drive"
was explained in the **General Information Manual**). Typing an L at the no-file
menu changes the screen display to the display shown in Figure 1-2 (at help
level 3):

```
L          editing no file

   The LOGGED DISK (or Current Disk or Default Disk) is the
   disk drive used for files except those files for which
   you enter a disk drive name as part of the file name.
   WordStar displays the File Directory of the Logged Disk.

   THE LOGGED DISK DRIVE IS NOW A:

   NEW LOGGED DISK DRIVE (letter, colon, RETURN)? ▮

DIRECTORY of disk A:
   CHAPTR1.DOC   CHAPTR1.BAK   CHAPTR2.DOC   CHAPTR2.BAK
   CONTENTS      FILE1.DOC     FILE1.BAK     FILE2.DOC
   LETTER.DOC    LETTER.BAK    MAILMRGE.OVR  TEST.DOC
   WS.COM        WSMSGS.OVR    WSOVLY1.OVR
```

Figure 1-2. L Command Display

To log a different drive, type the letter (A or B), an optional colon, and
RETURN (C, D, etc. are also acceptable if you have more drives). To leave the
logged drive unchanged, type ^U, or just press RETURN.

File Directory Toggle (the F Command)

The F command turns the file directory display off and on. The first F
entered turns the directory display off, the next F restores it, etc. No
additional information need be entered, and no screen changes take place.
However, when directory display is off, the no-file menu item for F changes to
read

          F=File directory on (OFF)

To display the directory of the diskette in a different disk drive, change the
logged drive with the L command (next example). To cause the directory on the
screen to be updated after putting a new diskette in a drive, re-log the same
drive with the L command, or press F twice.

Set the Help Level (the H Command)

The **help level** setting controls the amount of explanatory material automa-
tically displayed by WordStar, and determines whether and when part of the
screen is used while editing to display a "menu" of command keys which may be
entered.

The help level is initially set to 3, the most helpful level. As you gain experience with WordStar, you will want to reduce the help level in order to have more of the screen available for file display.

The help level is changed with either the **H command** on the no-file menu (above) or with the ^JH command (Section 2) while editing a file. Either command displays an explanation of help levels and current help level, and requests a new help level, as shown in Figure 1-3.

```
H               editing no file

 HELP LEVELS
    3   all menus and explanations displayed
    2   main editing menu (1-control-char commands) suppressed
    1   prefix menus (2-character commands) also suppressed
    0   command explanations (including this) also suppressed

 CURRENT HELP LEVEL IS 3

 ENTER Space OR NEW HELP LEVEL (0, 1, 2, OR 3): ▮

partial DIRECTORY of disk A:   ^Z=scroll up
  CHAPTR1.DOC   CHAPTR1.BAK   CHAPTR2.DOC   CHAPTR2.BAK
  CONTENTS      FILE1.DOC     FILE1.BAK     FILE2.DOC
  LETTER.DOC    LETTER.BAK    TEST.DOC
```

Figure 1-3. Help Level Command Display

The help level question takes a single-key response--no RETURN is needed. Pressing any key other than 0, 1, 2, or 3 leaves the help level unchanged.

Note

> If you enter a digit (or press any key) before the explanation displays, some or all of the explanation will be omitted. This provides rapid response for the user who knows what he wants and types, for example, "H2".

The **differences between help levels** 3, 2, and 1 are manifest primarily when editing a file, as noted in Section 2. Level 0 differs from the higher levels in that extra explanations associated with several commands are skipped. The explanations omitted at help level 0 include, for example, the explanation of the logged disk drive for the L command (Figure 1-2), the explanation of the help levels (Figure 1-3), and the explanations displayed by the D command (Figure 1-4).

The two lines which remind you of the control characters which may be used while answering any question whose prompt ends in a question mark,

```
^S=delete character    ^Y=delete entry    ^F=File directory
^D=restore character   ^R=Restore entry   ^U=cancel command
```

These prompts are displayed above such questions only at help level 2 or 3; but the keys work at all help levels, even if the prompts do not appear.

Messages like the two-line prompt above are displayed automatically—provided that a high enough help level has been set. But you may also call up other, longer messages to explain such things as setting the help level, entering text with WordStar, reforming a pargraph, reading the screen flags, using print control characters and dot commands, setting margins and tabs, setting place markers, and moving text. (See the "Help Menu" in Section 2 for more.)

THE COMMANDS USED TO OPEN A FILE

Table 1-2 gives brief descriptions of the commands used to open a file, followed by detailed descriptions in later paragraphs.

Table 1-2. Commands to Open a File

Command	Description
D	**Open a Document File.** Asks for a file name, then initiates editing of the specified file. The file specified may be an existing file or a new file.
N	**Open a Non-Document File.** Same as D except that the file is edited as a non-document, without dynamic pagination and with different defaults. Use D, not N, for normal WordStar word-processing (see Section 6).

Open a Document (the D Command)

With the no-file menu on the screen as shown in Figure 1-1, type D (or d or ^D) to begin editing a file. WordStar then displays an explanation and a request to enter the file name as follows:

```
  D           editing no file

     Use this command to create a new document file,
     or to initiate alteration of an existing document file.

        A file name is 1 to 8 letters/digits, a period,
        and an optional 1-3 character type.
        File name may be preceded by disk drive letter A-D
        and colon, otherwise current logged disk is used.

   ^S=delete character      ^Y=delete entry      ^F=File directory
   ^D=restore character     ^R=Restore entry     ^U=cancel command

        NAME OF FILE TO EDIT? █

  partial DIRECTORY of disk A:  ^Z=scroll up
    CHAPTR1.DOC   CHAPTR1.BAK   CHAPTR2.DOC   CHAPTR2.BAK
    CONTENTS      FILE1.DOC     FILE1.BAK     FILE2.DOC
```

Figure 1-4. D Command Display

You may then type the desired file name, followed by a carriage return (see the **General Information Manual**). The form of a file name is summarized on the screen as a reminder. For example, you might type

      LETTER.DOC   RETURN

to edit file LETTER.DOC on the logged drive, or

      B:LETTER.DOC   RETURN

to edit the file LETTER.DOC on the diskette in drive B.

To edit file BOOK.DOC on drive A and place the new version of BOOK.DOC on drive B, type:

      A:BOOK.DOC B: RETURN

After the carriage return, WordStar proceeds to editing the file, as described in Section 2. You may then enter text into the document and use WordStar's editing commands. If the file does not exist, NEW FILE is displayed for several seconds. If the NEW FILE message appears when you intended to edit an existing file, you probably typed the name wrong or have the wrong diskette in the drive. Abandon the edit (^KQ) to get back to the no-file menu.

<div align="center">Note</div>

> If the "help level" is zero, the explanatory material shown in Figure 1-4 is omitted from the screen display; only the question "NAME OF FILE TO EDIT" will appear. If you start typing the file name before display of the explanatory material, WordStar will omit some or all of the explanation.

Partial Directory Display

In an example above (Figure 1-3), the screen shows only part of the disk directory, as indicated by the word "partial". Partial directory display occurs whenever there are more file names than will fit on your screen. To view additional file names, use CTRL Z to move (scroll) the file directory display up a line, or CTRL W to move the file directory display down a line. Reminders about these control characters--"^Z=scroll up" and "^W=scroll down"--appear in the line above the directory whenever these characters can be entered and will bring more file names onto the screen.

QUESTION RESPONSES

Many WordStar commands ask the user questions for additional information. Some questions accept single-character answers; others accept a line of input terminated by carriage return. Each class has a number of common characteristics which we will describe here. In all cases, the "interrupt" character, ^U, may be typed to abort the command asking the question.

One-Character Answers

Questions that expect a one-character answer can be recognized by the fact that the prompt ends in a colon. These questions accept the next key pressed

as the response without waiting for RETURN to be typed. An example of such response is elicited by the "set help level" command question (see above).

Yes-No Questions

Some questions expect a yes-no answer; these have prompts of the form "...(Y/N): ." These questions accept Y, y, or ^Y (control-Y) as "yes" and any other key as "no". You are free to use the RETURN key, the space bar, or any handy key to indicate a "no" response. An example of such a question is the "REPLACE (Y/N):" question asked by the replace command (Section 5).

Line-Input Questions

These questions have prompts ending in "?". They include all file name questions (as from the D and P commands), the margin and tab stop column questions, and several others. When answering a line-input question, typing errors can be corrected; the previous response to the same question, or a portion thereof, can be restored without reentry. The file directory can be displayed and scrolled at will.

The answer to a line-input question can be terminated with the RETURN, LINE FEED, or ESCAPE keys. The ESCAPE key has a special meaning in the Print (P or ^KP), Find (^QF), and Replace (^QA) questions: it suppresses following options questions; for the margin and tab stop questions (^OL, ^OR, ^OI, and ^ON) ESCAPE means to use the cursor column (as shown in the status line), whereas RETURN means to abandon the command. In other cases ESCAPE is equivalent to RETURN. LINE FEED is always equivalent to RETURN.

When answering a line input question, you can correct typing errors (before the RETURN key is pressed), display the directory, and do other things with the special characters shown in Table 1-3. Note that ^X means control-X -- hold the CTRL key down while typing x.

At help levels 2 and 3, the following reminder of the more common special characters appears above most line-input questions; the special characters are valid at all help levels and at all questions whose prompt ends in "?".

```
^S=delete character    ^Y=delete entry    ^F=File directory
^D=restore character   ^R=Restore entry   ^U=cancel
```

Table 1-3. Special Characters for Responses

Character	Function
^Y	**Erase Entire Answer.** (You may also use ^X.)
^S	**Erase One Character.** (You may also use ^H, BACKSPACE, or DELETE.)
^D	**Cursor Right.** Unerase one character: one character is restored from a previously erased answer or from the answer given the last time the specific question was asked.
^R	**Unerase.** Restore an entire erased answer or a previous answer. To use the same response as last time (e.g., if you want to print a second copy of the same file), just type ^R and press RETURN.

Table 1-3. Special Characters for Responses (Continued)

Character	Function
^F	**Display File Directory.** Display the file directory of the logged disk drive for the duration of the current command. ^F does nothing if the directory is already on the screen.
^Z	**Scroll Directory Up.** If only part of the file directory is displayed, scroll the file directory up to bring additional file names into view.
^W	**Scroll Directory Down.** If only part of the file directory is displayed, scroll the file directory up to bring additional file names into view.
^P	**Use Next Key.** Use the next key pressed literally as part of the answer, even if it is a control character that normally has a special function, or one of the terminating characters. USE ^P- to enter a "hard" hyphen (regular -) even if soft hyphen entry (^OE) is ON. (See Section 4 for definitions of hard and soft hyphens.)
-	**Enter Soft Hyphen.** Enters a "soft hyphen" if soft hyphen entry has been turned ON (^OE; Section 4). Permits using soft hyphens in the "Find" and "Replace" commands. Use ^P- to force entry of a hard hyphen.
^U	**Interrupt.** Interrupts and terminates the command in progress; clears any commands or text already typed.

THE FILE COMMANDS

Table 1-4 gives brief descriptions of the file commands, with detailed descriptions of some commands in later paragraphs.

Table 1-4. File Commands

Command	Description
P	**Print a File.** The P command is used initially to start printing a document. However, once printing has started, pressing P a second time **suspends printing**; and once printed has been suspended, pressing P a third time **continues printing.** The P line in the menu changes as appropriate. Detailed descriptions of the three uses of the P command are given in Sections 7 and 8.
E	**Rename a File.** The E command allows you to change the name of a file. (E functions like the CP/M rename command REN.)
O	**Copy a File.** The O command allows you to make a copy of a specified file without having to use the CP/M program PIP.COM. You may copy files from or to different disks as long as both disks are on-line at the same time.

Table 1-4. File Commands (Continued)

Command	Description
M	**Run MailMerge.** Before you can use the MailMerge feature of WordStar, the MAILMRGE.OVR file must be present on the disk in drive A. The M command allows merging data from a data file into text at print time for production of form letters, and performs other enhanced print functions. IF MAILMRGE.OVR is not present, an error message will be displayed. (The MAILMRGE.OVR file is provided separately.) See Sections 9-12 for details.
S	**Check Spelling.** In order to run this WordStar feature, you must have the SPELSTAR.OVR file on the disk that contains WS.COM, WSOVLY1.OVR, and WSMSGS.OVR. The SPELSTAR.DCT file may be on either of your disks. The S command allows you to run WordStar's spelling program (SpellStar) to check for spelling errors. If SPELSTAR.OVR is not present, an error message will be displayed. (The SPELSTAR.OVR file is provided separately.) See Section 13 for details.
Y	**Delete a File.** Asks for file name, then erases the file. Performs the same function as the CP/M erase command ERA.

Check Spelling (the S Command)

With the No-file menu (Figure 1-1) on the screen, type S to begin a spelling check on a file, or to perform dictionary maintenance operations. The screen display then changes to the display shown in Figure 1-5 (at help level 3):

```
S          editing no file

For spelling check, enter name of file to be checked.
(^R for last file edited)

For dictionary maintenance, enter name of file
containing words to add or to delete from dictionary.


^S=delete character    ^Y=delete entry    ^F=File directory
^D=restore character   ^R=Restore entry   ^U=cancel command

    NAME OF FILE TO CHECK / ADD TO DICTIONARY? █

DIRECTORY of disk A:
 CHAPTR1.DOC    CHAPTR1.BAK    CHAPTR2.DOC    CHAPTR2.BAK
 SPELSTAR.OVR   SPELSTAR.DCT   FILE1.DOC      FILE2.DOC
 LETTER.DOC     LETTER.BAK     MAILMRGE.OVR   TEST.DOC
 WS.COM         WSMSGS.OVR     WSOVLY1.OVR
```

Figure 1-5. S Command Display

The S command is used to check a file with WordStar's new spelling program, SpellStar. For a detailed description of SpellStar, see Section 13.

Rename a File (the E Command)

The E command allows you to rename files without having to exit from WordStar.
(same as the CP/M REN command). When you type E, the screen changes to the
display shown in Figure 1-6 (at help level 3):

```
 E          editing no file

  ^S=delete character    ^Y=delete entry    ^F=File directory
  ^D=restore character   ^R=Restore entry   ^U=cancel command

     NAME OF FILE TO RENAME? ▮

 DIRECTORY of disk A:
  CHAPTR1.DOC    CHAPTR1.BAK    CHAPTR2.DOC   CHAPTR2.BAK
  CONTENTS       FILE1.DOC      FILE1.BAK     FILE2.DOC
  LETTER.DOC     LETTER.BAK     MAILMRGE.OVR  TEST.DOC
  WS.COM         WSMSGS.OVR     WSOVLY1.OVR
```

Figure 1-6. E Command Display

You may rename a file on another drive by specifying the drive before the name
of the file to be renamed (e.g. B:FILENAME.TXT). The **NEW NAME?** prompt is
displayed after the name of the file to be renamed has been entered.

Copy a File (the O Command)

The O command allows you to copy files without exiting from WordStar. When
you type O, the screen display (at help level 3) changes to the display shown
in Figure 1-7. (The second prompt appears after user's response to first.)

```
 O          editing no file

  ^S=delete character    ^Y=delete entry    ^F=File directory
  ^D=restore character   ^R=Restore entry   ^U=cancel command

     NAME OF FILE TO COPY FROM? ▮
     NAME OF FILE TO COPY  TO ?

 DIRECTORY of disk A:
  CHAPTR1.DOC    CHAPTR1.BAK    CHAPTR2.DOC   CHAPTR2.BAK
  CONTENTS       FILE1.DOC      FILE1.BAK     FILE2.DOC
  LETTER.DOC     LETTER.BAK     MAILMRGE.OVR  TEST.DOC
  WS.COM         WSMSGS.OVR     WSOVLY1.OVR
```

Figure 1-7. O Command Display

If the name of an existing file is entered as the file to copy to, WordStar displays the prompt

FILE d:name.typ EXISTS -- OVERWRITE? (Y/N): ■

Press Y (or y or ^Y) to proceed with the copy, destroying the present contents of file you are copying to. Pressing any other key will cause the NAME OF FILE TO COPY TO? question to be reasked; press RETURN or ^U to abort the copy command.

You may copy files from and/or to drives other than the logged drive by specifying a drive before the file name (e.g. B:FILENAME.TXT). The exact file name to be copied must be entered; you may not use asterisks (*) nor question marks (?). You may use hyphens in the file names (with this or any other WordStar command) if soft-hyphen entry (^OE; see section 4) is OFF (OFF is the default) or by entering the - as ^P-.

Delete a File (the Y Command)

With the no-file menu (Figure 1-1) on the screen, type Y to initiate deletion of a file. The screen display then changes to the display shown in Figure 1-8 (at help level 3):

```
Y           editing no file

 ^S=delete character    ^Y=delete entry    ^F=File directory
 ^D=restore character   ^R=Restore entry   ^U=cancel command

    NAME OF FILE TO DELETE? ■

DIRECTORY of disk A:
 CHAPTR1.DOC   CHAPTR1.BAK   CHAPTR2.DOC   CHAPTR2.BAK
 CONTENTS      FILE1.DOC     FILE1.BAK     FILE2.DOC
 LETTER.DOC    LETTER.BAK    MAILMRGE.OVR  TEST.DOC
 WS.COM        WSMSGS.OVR    WSOVLY1.OVR
```

Figure 1-8. Y Command Display

Enter the name of the file to delete, followed by RETURN. The form of a file name and use of control characters to correct typing errors, is the same as for the D command (previous example).

After the file is erased, the no-file menu reappears on the screen and another command may be entered. If you enter a Y, then decide not to delete a file, you may cancel the command with ^U, or by pressing RETURN only.

THE SYSTEM COMMANDS

Table 1-5 gives brief descriptions of the system commands, followed by detailed descriptions in later paragraphs.

Table 1-5. System Commands

Command	Description
R	**Run a Program.** The R command allows you to run a program without exiting from WordStar. For example, the amount of disk space could be checked by using the CP/M program STAT.COM.
X	**Exit to System.** Exit to CP/M (or other operating system). Use X when you are through with WS and wish to use a system command.

Run a Program (the R Command)

The R command allows you to run a different program without exiting from WordStar. This command is especially useful for determining the amount of available disc space by running the CP/M program STAT. When R is entered at the no-file menu, the prompt shown in Figure 1-8 is displayed (at help level 3):

```
  R          editing no file

  Enter name of program you wish to Run,
  optionally followed by appropriate arguments.
       Example (shows disk space):    STAT

  ^S=delete character   ^Y=delete entry    ^F=File directory
  ^D=restore character  ^R=Restore entry   ^U=cancel command

     COMMAND? ■

DIRECTORY of disk A:
  CHAPTR1.DOC   CHAPTR1.BAK   CHAPTR2.DOC   CHAPTR2.BAK
  CONTENTS      FILE1.DOC     FILE1.BAK     FILE2.DOC
  LETTER.DOC    LETTER.BAK    MAILMRGE.OVR  TEST.DOC
  WS.COM        WSMSGS.OVR    WSOVLY1.OVR
```

Figure 1-9. R Command Display

Enter the name of the program to be run and press RETURN. Only executable programs (file type .COM) should be specified. An attempt to Run a non-executable file may result in an error message, or may lock up your system making it necessary to re-boot. When the program has completed, the following prompt is displayed:

> Hit any key to return to WordStar:

This allows you to view any results displayed by the program before returning to the WordStar no-file menu.

The R command will handle any CP/M console command (CCP command) except the resident commands (TYPE, DIR, ERA, REN, and SAVE). File names or other arguments may follow the program name, as in CP/M commands. For example:

> STAT LETTER.DOC

shows the size of file LETTER.DOC on the logged drive. Asterisks and question marks can be used to form "wild card" file names, as in CP/M console commands. For example:

> STAT B:*.DOC

shows the size of all files of type .DOC on the diskette in drive B.   (*'s and ?'s are not allowed in file names entered in other WordStar commands.)

In order to use the R command, you must have WS.COM (or other name as specified during INSTALLation) on the disk in drive A or the current logged drive.

Exit to the System (the X Command)

The X command is used to exit to the operating system (CP/M). When you type an X at the no-file menu, the CP/M prompt (A>) appears at the bottom of the screen.

Section 2
Getting Acquainted
with WordStar

WORKING WITH A DOCUMENT

This section provides an overview of document editing. Later sections focus on specific topics. Enough commands and general background are given in this section to allow you to enter and modify text.

For best results, turn on your computer, start WordStar and type D, followed by a filename to open a file. Then try each command as it is described here. A little experience will go a long way in familiarizing you with WordStar's power.

Opening a Document

To open a document, type D from the No-File Menu (Section 1). If this file is being opened for the first time, Wordstar will first display NEW FILE for a few seconds; if the file has been opened before, the NEW FILE message will be skipped.

WordStar then enters its file-editing state. For a new file and help level 3, the screen appears as follows:

```
      A:TEST.DOC   PAGE 1 LINE 1  COL 1              INSERT ON
                  < < <      M A I N   M E N U      > > >
 *  *  Cursor  Movement  *  *|* Delete *|  * Miscellaneous * | * Other  Menus *
^S char left   ^D char right |^G  char  |^I Tab   ^B Reform  | (from Main only)
^A word left   ^F word right |DEL chr lf|^V Insert On or Off |^J Help  ^K Block
^E line  up    ^X line down  |^T word rt|^L Find/Replce again|^Q Quick ^P Print
 *  *   Scrolling    *    *|^Y  line    |RETURN End paragraph|^O Onscreen
^Z line up    ^W line down  |          |^N  Insert a RETURN  |
^C screen up  ^R screen down|          |^U  Stop a command   |
L----!----!----!----!----!----!----!----!----!----!----!---------R
■
                                                                    .
                                                                    .
                                                                    .
                                                                    .
                                                                    .
                                                                    .
```

Figure 2-1. Screen Display for a New File

The top line is the **status line.** A:TEST.DOC is the name of the file being edited; the page, line, and column are those of the cursor position, and will change as you enter text or move the cursor.

The **main menu** occupies the next eight screen lines, assuming the help level is
still set to 3. (For the convenience of users with 40-column screens, the
display can be paged from left to right.) The menu provides a brief reminder
of the functions of the different command keys. We will describe some of the
functions in this section, with complete coverage in Sections 3-6. In the
menu, as in this manual, the ^ symbol means to hold down the CTRL key while
typing the key that follows.

The line below the menu is the **ruler line:**

    L----!----!----!----!----!----!----!----!----!----!----!--------R

The L indicates the current left margin setting; R indicates the right margin,
and !'s indicate where tab stops are set.

The menu and ruler line are "highlighted" on terminals with bright/dim or
inverse video (black on white) capability to distinguish them from the docu-
ment being edited.

The portion of the screen below the ruler line is the **text area,** where text
from the document being edited is displayed. For a new file, the text area is
initially blank; for an old file, the text area shows the first several lines
of text.

Entering Text

To enter text, just start typing. Each non-control character typed is entered
into the text of your document. If you type beyond the right margin, notice
that **WordStar** moves the word that wouldn't fit inside the margin to the next
line, positioning the cursor after the word to allow you to continue typing.
This is **word wrap.** You will also notice that **WordStar** adds spaces between
words to make the right margin line up. This is **justification.**

When entering text within a paragraph, don't use the **RETURN** key—let word wrap
do the work. Section 4 describes commands to set the margins, disable justi-
fication, specify double spacing, etc., to control the appearance of text
entered under word wrap.

To make a correction or addition, move the cursor to the desired position and
type the new text.

Moving the Cursor

To move the cursor, use the cursor up, down, left, and right commands as shown
on the menu. You will find the cursor left and right **word** commands faster
than the cursor left and right **character** commands when you wish to move
across a line. (Either ^H or the **BACKSPACE** key, if your terminal has one, may
be used for moving the cursor left by character.

When you type with the cursor on a character previously entered, you will
notice that WordStar inserts the new characters and pushes the old characters
to the right. This is **insertion.** Insertion is initially ON. Insertion may
be turned OFF, and back ON, by typing ^V. Characters typed with insertion OFF
will **overtype** (replace) existing characters. The status line shows whether
insertion is on.

Deleting Characters

After making a correction by backing up the cursor and typing the desired text, unwanted characters may remain at, and to the right of, the cursor. To delete these, use the ^G (delete character right) command. Each press of the ^G key deletes the character at the cursor, moving the following part of the line left one character. (Use ^T to delete all or part of a word.)

If you notice a typing error immediately, you may use the **DELETE** (or **RUBOUT** on some keyboards) key, then type the corrected text. Each press of the **DELETE** key deletes one character to the left of the cursor, moving the cursor left. Other deletion commands are shown on the menus and described in Section 3.

After you have made changes in a paragraph, the right margin may no longer be lined up. Some lines may be too short, others may be too long. There may be document lines which are so long that they extend beyond the right-hand edge of the screen. (Wordstar no longer wraps long lines to a new line.)

Realigning the Right Margin

To realign the right margin of a paragraph entered under word wrap, use the reform command (^B), as follows: place the cursor in or above the first "messy" line and type ^B. **WordStar** will "reform" all the lines to the next place **RETURN** was pressed (as indicated by a < in the rightmost screen column).

While the paragraph reform command (^B) is working, it may encounter a long word that won't quite fit on a line and looks as though it can be hyphenated. When this occurs, **WordStar** will display an explanatory message and stop reforming to allow you to press the hyphen (-) key (if you wish to hyphenate the word at the cursor position), or to press ^B to continue reforming without hyphenating. This "Hyphen-Help" feature is described in detail in Section 4.

Reforming a long paragraph takes several seconds, during which "^B" appears in the upper left corner of the screen. The reformed text is displayed only after the reforming is complete or a word to hyphenate has been encountered.

Making Blank Lines

To insert a new paragraph, begin by pressing ^N to make one or more blank lines after the cursor. Then type the desired text. Wordstar will insert a new blank line automatically each time word wrap takes place.

Pausing for the System

When the screen is filled with text and the cursor is on the bottom line of the screen, the screen will start to **scroll** (roll) upward each time the cursor goes to a new line. If you type fast, the screen may not keep up, but when you pause, the display will be updated to reflect all characters typed.

Occasionally the word WAIT may appear in the status line, usually accompanied by an audible click from your disk drive. When this happens, stop typing or type slowly until WAIT disappears.

Page Breaks

When you have entered more text than will print on a page, a line of hyphens appears across the screen, with a P in the rightmost column, to show you where the page break will occur during printing:

---P

This is **dynamic page break display.** In section 7 we will discuss the use of "dot commands" to specify places where you want a new page to begin even though the current page isn't full, and to specify formatting items such as the number of lines printed on a page.

Examining Text

To look at text which is currently not on the screen, use the "scroll up line", "scroll down line", "scroll up screenful", and "scroll down screenful" commands shown on the menu to bring the desired text into view. Also, "cursor down" with the cursor already at the bottom of the screen scrolls the screen up a line, and "cursor up" at the top scrolls it down.

Depending on the type of terminal you have, commands such as "scroll down line" may immediately move the screen down, or may redisplay all the text on the screen, taking a second or two. It is not necessary to wait for the previous command to complete to enter the next one. If you know you want to move the file display down five lines on the screen, type five ^W's rapidly. Each one will interrupt the redisplay started by the previous one; when the screen stops changing, text on the screen will have moved down five lines, with five lines gone off the bottom and five previously not visible lines displayed at the top.

You will notice that the behavior of the editing commands reflects the way characters are stored in the file. For example, if you keep moving the cursor "right", after getting to the end of the line it will move to the left end of the next line down on the screen. This is because the file contains the characters of a line, in left-to-right order, then a "carriage return" character, then the characters of the next line; the carriage return is between the rightmost character of one line and the leftmost character of the next.

If you move the cursor as far right as it will go without moving to the next line, then give a "delete character right" (^G) command, the carriage return will be deleted, joining the next screen line onto the end of the one the cursor is on. Generally, carriage returns can be edited like other characters.

USING THE MENUS

WordStar has far more commands than there are control keys. Hence, many commands require two-character sequences. The first character, referred to as the **prefix** key, selects one of five additional menus. All two-character commands begin with ^Q, ^J, ^K, ^O or ^P; these five prefix keys are listed in the right-hand column of the main menu for ready reference.

If you type a prefix key then wait about a second, a new menu will appear, showing all the commands that begin with that prefix. The delay is so that if you know the command you want, you may type the two keys rapidly, in which case the menu display won't change.

If you type a prefix then don't want any of the commands on its menu, type a space, or some other key not defined on the menu. The main menu will reappear. You can look at a menu by typing the prefix, reading as desired and then pressing the space bar to "cancel" the prefix. You can search for a command by calling up all of the menus in succession in this manner.

The second character of the two-key command may be typed with or without the CTRL key, with the same effect; letters may also be typed in upper or lower case.

The Quick Menu

For example, ^Q brings up the **Quick Menu** (the exact appearance of the menus on your screen may be slightly different, because of revisions and because the menus display differently for 64-column wide screens than for 80 column or wider screens):

```
^Q        A:TEST.DOC  PAGE 1 LINE 1  COL 1              INSERT ON
                    < < <     Q U I C K   M E N U    > > >
 *  *   Cursor Movement  *  *|* Delete *|  * Miscellaneous *  | * Other  Menus *
S left side     D right side |Y line  rt|F Find text in file  | (from Main only)
E top of scrn   X bottom scrn|DEL lin lf|A Find and  Replace  |^J Help  ^K Block
R top of file   C end of file|*  *  *  *|L Find  misspelling  |^Q Quick ^P Print
B top of block  K end of block         |Q Repeat command or   |   ^O Onscreen
0-9 marker      Z up    W down         | key   until   space  |Space bar returns
V last Find or block                   | bar  or other key    |you to Main Menu.
L----!----!----!----!----!----!----!----!----!----!----!--------R
■
```

Figure 2-2. The Quick Menu

You can see additional cursor motion commands, such as top of screen and end of file, commands for deleting the left and right portions of a line, commands for finding and substituting, and additional commands that are probably not self-explanatory. All of these will be detailed in later sections; you do not need to know all of them to begin using WordStar.

The Block Menu

The **Block Menu** includes some very important commands, those for working with blocks, for saving files, and for working with files (Figure 2-3):

```
^K        A:TEST.DOC   PAGE 1 LINE 1  COL 1              INSERT ON
                    < < <      B L O C K    M E N U    > > >
  * Saving Files * |* Block Operations *| * File Operations *| * Other   Menus *
  S Save and resume|B  Begin   K  End   |R  Read    P  Print  | (from Main only)
  D Save—done      |H  Hide / Display   |O  Copy    E  Rename |^J Help  ^K Block
  X Save and exit  |C  Copy    Y  Delete|J  Delete           |^Q Quick ^P Print
  Q Abandon file   |V  Move    W  Write |* Disk  Operations *|^O Onscreen
  * Place  Markers *|N Column    off (ON)|L Change logged disk|Space bar returns
  0-9 Set/hide # 0-9|                    |F Directory on (OFF)|you to Main Menu.
  L——!——!——!——!——!——!——!——!——!——!——!———R
  ■
```

Figure 2-3. The Block Menu

Saving a File

As noted in the **General Information Manual,** text entered and altered during
editing is in a transitory "working document" only. You must issue a "save"
command if you want your document available for later use. The basic "save"
command is ^KD, which saves the working document under the file name chosen
when the edit was initiated, then returns to the no-file menu (Section 1).

Also on the Block Menu is the print command, ^KP, which is used when editing
is in process to initiate, stop, and continue printing. (When editing is not
in process, the P command on the no-file menu performs exactly the same
functions.)   Since only saved documents (as opposed to the working document
you are in the midst of editing) can be printed, you will normally print a
different file than the one being edited.

Printing a Document

Printing will be described in detail in Sections 7 and 8; basic printing can
be accomplished as follows: First, if you have just entered the material you
wish to print, save it (^KD). Make sure your printer is ready (turned on,
initialized,loaded with paper, etc.) and that the paper is positioned as
desired. Then type a P command at the no-file menu; type ^KP if you are
editing. WordStar will ask for

              NAME OF FILE TO PRINT? ■

Type the name of the file, and press ESCAPE. Printing will commence and the
no-file menu (or the file being edited) will return to the screen. Other
commands may be given while printing is in progress.

You can edit one document while another document is printing. However, key-
board response is slower, so we suggest editing while printing mainly for
reviewing text on the screen and making occasional slowly-typed corrections.

The Onscreen Menu

The **Onscreen Menu** contains commands that allow you to set double spacing,
change margins and tab stops, disable word wrap, and perform other functions
related to on-screen document formatting:

```
^O        A:TEST.DOC  PAGE 1 LINE 1  COL 1              INSERT ON
                  < < <  O N S C R E E N   M E N U  > > >
* Margins & Tabs * |* Line  Functions *| * More Toggles * | * Other  Menus *
L Set left  margin |C Center text     |J Justify   off (ON)| (from Main only)
R Set right margin |S Set line spacing |V Vari-tabs off (ON)|^J Help  ^K Block
X Release  margins |                  |H Hyph-help off (ON)|^Q Quick ^P Print
I Set   N Clear tab|   * Toggles  *   |E Soft hyph on (OFF)|^O Onscreen
G Set paragraph tab|W Wrd wrap off (ON)|D Prnt disp off (ON)|Space bar returns
F Ruler from line  |T Rlr line off (ON)|P Pge break off (ON)|you to Main Menu.
L————!————!————!————!————!————!————!————!————!————!————!————————R
█
```

Figure 2-4. The Onscreen Menu

In addition, the Onscreen Menu shows whether word wrap, justification, and
other features are currently ON or OFF. In the above example, all toggles are
ON.

The Print Menu

The **Print Menu** is used for entering print control characters (described in
the **General Information Manual** and in Section 7 of this manual):

```
^P        A:TEST.DOC  PAGE 1 LINE 1  COL 1              INSERT ON
                  < < <    P R I N T    M E N U   > > >
*Special Effects*| * Special Effects * |* Printing Changes *| * Other  Menus *
 (begin and end) |   (one time each)   |A Alternate pitch   | (from Main only)
B Bold   D Double|H Overprint character|N Standard pitch    |^J Help  ^K Block
 S Underscore    |O Non-break space    |C Printing pause    |^Q Quick ^P Print
 X Strikeout     |F Phantom space      |Y Other ribbon color|^O Onscreen
 V Subscript     |G Phantom rubout     | * User  Patches  *|Space bar returns
 T Superscript   |RETURN Overprint line|Q(1) W(2) E(3) R(4) |you to Main Menu.
L————!————!————!————!————!————!————!————!————!————!————!————————R
█
```

Figure 2-5. The Print Menu

The Help Menu

To complete the menu presentations, the **Help Menu** shows commands for control-
ling help levels and displaying reference information and learning aids:

```
^J       A:TEST.DOC  PAGE 1 LINE 1 COL 1              INSERT ON
                  < < <      H E L P   M E N U      > > >
                                     |                  | * Other  Menus *
 H Display and set the help level    | S Status line    | (from Main only)
 B Paragraph reform (CTRL B command) | R Ruler line     |^J Help  ^K Block
 F Flags in rightmost column of screen | M Margins and tabs |^Q Quick ^P Print
 D Dot commands, print ctrl(P command) | P Place markers  |^O Onscreen
                                     | V Moving text    |Space bar returns
                                     |                  |you to Main Menu.
L----!----!----!----!----!----!----!----!----!----!----!--------R
■
```

Figure 2-6. The Help Menu

^JH displays, explains, and sets the help level, in the same manner as the H
command on the no-file menu, Section 1. The rest of the commands display
explanations. For example, ^JV explains how to move a block of text, ^JX
helps find commands for various functions, and ^JD summarizes the ordinary
dots commands. Some of these help commands display several screens of infor-
mation; WordStar awaits a keystroke between screens.

Help Levels

As you gain experience using WordStar, you will learn the commands, and you
will want to see more of your document on the screen instead of the menus. If
you change the help level (discussed in Section 1) from 3 to 2 with the ^JH
command, the main menu will not display. The prefix menus will appear whenever
you type a prefix key if you pause before hitting another key. If you change
the help level to 1, the prefix menus will also be completely eliminated.
Further changing the help level to 0 eliminates explanations displayed by
various individual commands, such as the no-file D command or the help level
command (Section 1).

THE SCREEN DISPLAY

The screen display during editing consists of the status line, the menu, the
file directory (if enabled), the ruler line, and the file display area. The
file display area shows text from the file being edited plus "flag" characters
in the rightmost column. The file display is updated only when WordStar has
completed all commands which have been entered.

The Status Line

During editing, the status line on the top line of the screen usually shows
the following items:

- The command being entered or executed, if any

- The name of the file being edited

- PAGE number

- LINE number

- COLumn number

- INSERT ON   (if insertion is on)

- plus other phrases as applicable

The file name will disappear if necessary in order to allow all of the addi-
tional status line information to fit on the screen line.

The command in progress, if any, is shown in the upper left corner as the
characters typed to invoke the function. If only the first (prefix) key of a
two-key command has been entered, this character will display. If you type
several commands ahead, they will display in sequence as executed. Exception:
fast single-key commands, such as "cursor down line", do not display.

DOCUMENT DISPLAY

The next three status line items are normally these:

        PAGE pp LINE 11 COL cc

These are the print page number, print line number on the page, and print
column number of the character at the cursor. They are continuously updated as
the cursor is moved.

   The PAGE is the printout page number, assuming that the document is
   printed with page numbers running up from 1. If different printout page
   numbers are specified (by "dot commands" described later), these numbers
   will not be reflected in the status line.

   The LINE is the printout line; and does not count dot command lines
   (which control printout).

   The PAGE and LINE will not correspond exactly to the printout in certain
   cases of dot command use (e.g., if the paper length (.PL dot command) is
   changed in mid-document). See "Dynamic Page Break Display" in the Gen-
   eral Information Manual.

   The COLUMN is the print column, not the screen column. The print column
   differs from the screen column when the line contains a non-printing
   character such as print control character (e.g., ^S to invoke under-
   lining), or when a marker (described in Section 6) is shown in the
   display line.

NON-DOCUMENT DISPLAY

If you initiate editing with the non-document command N (Section 6) or if page break display has been suppressed (^OP command, Section 4), then the page and line are replaced with:

FC=ccccc FL=llll

FC=ccccc gives the file character number, or the number of characters between the cursor and the beginning of the file, plus 1. This counts all characters (bytes) stored in the file, including carriage returns, line feeds, etc.

FL=llll gives the file line number, or the number of file lines (including dot command lines) between the cursor and the beginning of the file, plus 1.

Thus, when this type of status line is displayed, you can determine the size of the file in characters by moving the cursor to the end of file (^QC) and reading the FC=ccccc item.

OTHER ITEMS

The remaining items in the status line are phrases which display under the conditions indicated:

WAIT	Shows when WordStar is reading or writing to the diskette. When this appears, stop typing, or type very slowly; otherwise characters you type may be missed.
MAR REL	Shows when margins are released (^OX command, Section 4).
decimal	Shows after tabbing to a decimal tab stop, as long as the decimal right-aligning action is in effect, as described in Section 4.
INSERT ON	Shows when insertion is on, that is, when typed characters are inserted into the file rather than typed over other characters in the file. Insertion is turned on and off by typing ^V.
LINE SPACING n	Shows except when single-spacing is in effect. The line spacing can be set with the ^OS command, Section 4.
PRINT PAUSED	Shows when printing of a file is suspended--after being stopped by user command, when stopped at a "pause for typewheel change" print control character (Section 7), or when a page has been completed under the PAUSE BETWEEN PAGES option (Section 8).
REPLACE (Y/N):	This question is displayed in the status line by the replace command (Section 5).

Note

When several of the above phrases appear at once, it is normal for
the LINE SPACING item to disappear off the right edge of the screen.

The Menu

A menu of editing commands may appear below the status line as described and
illustrated earlier in this section.

The main menu, showing single-control-character (non-prefix) editing commands,
displays at the default help level, level 3 (Section 1). When the help level
is 2 or 3 and a prefix key (as shown on the main menu) is pressed, after a
short pause, the command menu for that prefix is displayed. The menus, as
well as the status line and ruler line, are displayed highlighted (in inverse
video or dim display, when available) for differentiation from file text.
When no menu is on display, more of the screen is available for file text
display.

A number of explanatory and warning messages display above or below the menu
under certain conditions. For example:

TYPE ^KP TO CONTINUE PRINT

(explanation; appears during print pause)

*** WARNING: WORD TOO LONG TO FIT MARGINS

(warning; occurs when an overlong line with no spaces or
other possible word wrap points is entered or reformed)

Most such messages are cleared at the next keystroke. Messages and the condi-
tions which cause them are described in Appendix B.

The File Directory

Normally, the file directory is not displayed during editing. However, the
^KF command may be used to invoke directory display during editing if desired.
(Also, a temporary file directory display may be invoked by typing control-F
while entering a file name). When enabled during editing, the directory
appears between the menu and the ruler.

Usually while a file is being edited, WordStar will only display a partial
directory to leave more screen space for file display. The ^Z and ^W commands
on the main editing menu will scroll the directory up and down in order to
allow viewing of all file names. (When the directory is not displayed, or
when there are no more directory lines to scroll onto the screen, these
commands scroll the file display.)

The file directory is normally displayed in alphabetical order, with .BAK
files after the corresponding non-.BAK file, and with non-text files such as
.COM and .INT files at the end. Temporary files (.$$$) are also shown at the
end of the directory. However, if the directory is unusually long (more than
about 64 filenames of average length), it is normal for it to display
unsorted. Long directories also display and scroll more slowly than those of
moderate size.

The file directory (and occasionally also the ruler) will disappear temporarily when the menu, or questions evoked by various commands, or other messages use too many screen lines. Users with 16-line screens will observe this disappearance most often. The directory will reappear as soon as screen space permits.

The Ruler Line

Below the menu and file directory (when present), the highlighted ruler line

L——!——!——!——!——!——!——!——!——!——!——!——!———R

shows the current left margin (L), right margin (R), and variable tab stops (!). Decimal tabs (Section 4) will show as #'s. Non-tab columns between the margins display as hyphens. If the L or R setting occurs at a tab column, the ! or # will be shown.

If the left margin is temporarily moved in with the paragraph tab command (^OG, Section 4), the L does not move, but the portion of the ruler outside the temporary margin is displayed without highlighting.

Tab stops set outside the margins are active, and show as !'s or #'s, only when the margins are released (^OX command, Section 4) or word wrap is off (^OW, Section 4). If the right margin is set wider than the screen, text beyond column 79 can be viewed by moving the cursor past the rightmost column. The ruler line display can be eliminated and restored with the ^OT command, Section 4. If the ruler display is turned off while the file directory display is turned on, WordStar uses a highlighted line of equal signs (=) to separate the directory display from the file display.

The Text Area

The rest of the screen displays lines of text from the document being edited. The portion of the document displayed always includes the cursor position in the file, so that the screen cursor can correspond to the the file cursor.

All columns of the screen except the rightmost are used to display text. For example, on an 80-column screen, at most 79 columns of text will appear on a line. The rightmost column of the screen is blank or displays a "flag" character to indicate a special type of line or a "hard" carriage return, as explained in the following paragraphs.

EXCEPTIONAL LINES

Each line in the file display area shows what will usually print on one line of the document; exceptions include the following:

Continuation Lines

If a line is too long to be displayed on one screen line (79 columns for an 80-column screen), WordStar will display as much of the line as the screen will allow. That portion of the line that is beyond column 80 may be brought into view by moving the cursor past column 79. When the cursor is past column 79 (and the continuation line is on-screen), the column number shown in the status line still reflects the print column, not the screen column now occupied by the cursor.

Overprint Lines

For special effects, it is possible to have two or more consecutive lines
which print over each other, so that two different characters can be printed
in the same position to form a special graphic. On the screen, a hyphen (-)
in the rightmost column (i.e., the "flag" column) indicates that the next
screen line will print over the line so flagged. To terminate a line to be
overprinted, type ^P and press RETURN to enter a carriage return without line
feed, as described in Section 4.

Page Break Lines

The dynamic page break display feature shows a line of -'s, with a P in the
rightmost column, at places where a page break will fall during printout:

        --P

This line is added only for display purposes; there is no such line in the
document. (If the page break is caused by a "form feed" (^L) character in the
file, then the form feed (and the characters preceding it, if any) are shown
on the screen line, with hyphens to their right.) The display of page break
lines can be turned off, and back on, with the ^OP command.

End-of-File Lines

When the document ends before the bottom of the screen, the remainder of the
screen displays blank lines with periods in the rightmost (flag) column. For
a new file, the screen is initially filled with such lines.

Beginning-of-File Lines

If the file display is moved down on the screen until the beginning of the
file is below the top of the display area, the portion of the screen above the
beginning of the file is filled with blank lines with colons (:) in the
rightmost column.

Ordinary Lines

Ordinary lines in the file display area show lines of text from the file that
are not longer than the screen line and are not overprinted by the next line.
Such lines can end in a "hard" or a "soft" carriage return, as described in
the General Information Manual; the hard carriage return is indicated with a <
flag, and the soft carriage return with a blank flag.

The following example shows the screen's appearance after entering two
paragraphs and a list, illustrating the display of hard and soft carriage
returns. No menu is shown, indicating that the help level is set to 2 or
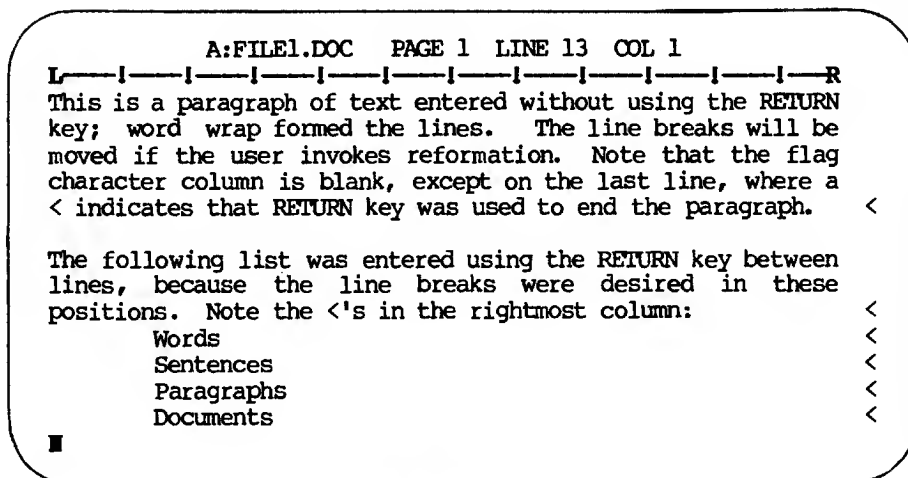less. The symbol ■ represents the cursor.

```
         A:FILE1.DOC    PAGE 1   LINE 13   COL 1
L—!——!——!——!——!——!——!——!——!——!——!—R
This is a paragraph of text entered without using the RETURN
key;   word   wrap  formed  the  lines.    The  line  breaks  will  be
moved  if  the  user  invokes  reformation.    Note  that  the  flag
character  column  is  blank,  except  on  the  last  line,  where  a
< indicates that RETURN key was used to end the paragraph.      <

The following list was entered using the RETURN key between
lines,   because   the   line   breaks   were   desired   in   these
positions.  Note the <'s in the rightmost column:             <
             Words                                            <
             Sentences                                        <
             Paragraphs                                       <
             Documents                                        <
  ▮
```

Figure 2-7. Appearance of Text on the Screen

FILE CHARACTER DISPLAY

Files edited by WordStar may contain all ASCII characters (hexadecimal code
values 0 - 7F) except control-Z (1A hex). Most terminals display only the
printing characters (codes 20 - 7E hex). WordStar uses combinations of charac-
ters to display other codes:

Table 2-1. Non-displayable Characters

Character	How Displayed
CTRL I	**Tab (09 hex).** Enough spaces to move to next multiple of 8 columns. Note: this character is common in non-documents such as program source files, but it is not used for WordStar's variable stop tabs. See Section 6.
Other Control Characters	^ and letter or punctuation character (except 1E and 1F hex, which are used internally to represent soft hyphens and display as highlighted hyphens (-).
Delete	**Tilde (~, 7E hex).** Occurrence of this character in a file is unlikely.

Control letters are common in document files as they are used to control print
enhancements such as underlining. They display as ^ and a letter, just as they
are printed in this manual. Although two characters appear on the screen only
one character is in the file and is edited as a single character. For example,
a "delete character" command (^G) will result in the disappearance of both the
^ and the letter from the screen.

Flag Characters

Most of the "flag" characters which can appear in the rightmost column of the file display area were introduced earlier in this section; Table 2-2 summarizes all of them for reference.

Table 2-2. Flag Characters

Character	Meaning
	Blank. Line ends in "soft" (mid-paragraph) carriage return; this line break may be changed by subsequent word wrap or paragraph reform operations.
<	Line ends in "hard" carriage return; this line break will not change in subsequent word wrap or reform operations.
+	This line is continued beyond column 80; an attempt to move the cursor to the right of column 80 will bring more of the line into view.
−	Next line will overprint this line.
.	This screen line is after (below) the end of the document. Also appears on last line of document if there is no carriage return after the text.
:	This screen line is before (above or prior to) the beginning of the document.
P	New page begins with following screen line. Appears only when page break display is on (^OP).
?	Line contains an unrecognized, and possibly erroneous, "dot command" (Section 7). Also appears while a dot command line is being typed in; disregard until entry is complete. Does not appear when editing a "non-document" (Section 6).
J	Line ends in "line feed" character without "carriage return" character. This is a non-standard file format never created in normal WordStar use.
M	Line contains a MailMerge dot command. See MailMerge (Sections 9-12).

Note

The flag character is not displayed on the last line of most terminals. Because of notmal hardware limitations, this position is left blank. Scroll the display up a line (^Z) to see the flag column character for the last line.

Screen Updating

The file display area of the screen is updated at the end of each command, or after each character of text entered, provided that no further keys have been struck.   Only the changed portions of the screen are redisplayed.

The file display is not updated until the command has been executed complete-ly.   For example, the cursor to end of file command (^QC) can take several seconds or longer, during which the screen remains unchanged, except that ^QC displays in the upper left hand corner and DISK WAIT appears if necessary.

Screen update is further deferred until all characters typed have been proces-sed, allowing WordStar to process commands and text entry typed at a much higher burst rate than the terminal display can keep up with.   For example, if several "scroll up screenful" commands (^C) are typed quickly, the file dis-play area remains unchanged until all of them have been processed.   This allows rapid motion through the file.

If a character is typed while WordStar is in the midst of updating the screen, the update will be suspended until that character is processed, momentarily (or longer, if a slow command was entered) leaving the screen in a partially updated state.

EXCEPTION

The scroll up line (^Z) and scroll down line (^W) commands always display the new line scrolled onto the screen immediately.   This makes possible rapid upward scrolling with all lines displayed, by holding down repeat CTRL Z.   (On some keyboards, any key which is held down repeats; on others, there is a separate REPEAT key which should be held for repetitive transmission.)   Simi-larly, repeat-control-W will scroll the text downward continuously on termi-nals capable of downward scrolling.

HINT

All terminals are capable of "scrolling" the text upward, but on those without the "line delete" code, WordStar will scroll instead of redisplay only if there is no menu above the file display area.   Thus, users of "dumb" terminals will obtain faster upward scrolling (for example, with the ^Z command) if they suppress the menu by reducing the help level.

Section 3
Basic Editing

Sections 3-6   describe all of the commands that are available while editing a file.   The descriptions are organized into categories to facilitate reference. The categories are organized in the approximate order a new user will need to learn commands.   But this doesn't mean that all commands in a category should be learned before progressing to the next.

Each section includes concise tables of commands and most sections include additional descriptions.   In particular, Section 4 contains extensive description of the use of WordStar's on-screen text formatting features.

The commands that are available when not editing a file (at the no-file menu) are described in Section 1.

CURSOR MOTION

Cursor motion commands are used to place the cursor at the desired point in the text before making a correction or addition.   All scroll motion commands move the display of the document up or down on the screen, or display an entirely different screen of text as necessary to bring the cursor destination into view.

As noted at the end of this section, the cursor will not go to places on the screen that do not represent characters in the file.

Table 3-1 shows all of the commands relating to cursor motion.   The second character of a two-key command is shown as an upper case letter, but it may also be entered as a lower case letter or a control character.

Note that the basic cursor motion keys (^S, ^E, ^D, and ^X) are arranged in a diamond on your keyboard.   The position of the keys corresponds to the direction of cursor motion:

```
                    +--------+
                    |   E    |
                    |   up   |
          +--------+--------+--------+--------+
          |   A    |   S    |   D    |   F    |
          |  left  |  left  | right  | right  |
          |  word  |        |        |  word  |
          +--------+--------+--------+--------+
                    |   X    |
                    |  down  |
                    +--------+
```
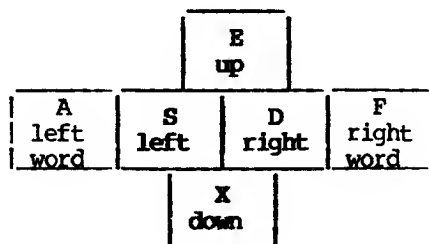
Figure 3-1. The Cursor Diamond

The adjacent keys to each side of the diamond, ^A and ^F, move the cursor farther in the same direction—to the next word instead of the next character. Furthermore, prefixing any of the four basic diamond keys with ^Q moves the cursor as far as it will go on the screen in that direction.

Table 3-1. Cursor Motion Commands

Command	Description
^S	**Cursor Left Character.** Moves the cursor to the previous character in the file, going to the end of the preceding line if at the beginning of the current line. One common use of this command is to back-space over characters just entered to make a correction. (^H and BACKSPACE are equivalent to ^S).
^D	**Cursor Right Character.** Moves the cursor to the next character in the file, going to the beginning of the next line if at the end of the current line.
^E	**Cursor Up Line.** Moves the cursor up to the preceding screen line. The cursor remains as nearly as possible in the same print column; moves left if needed to avoid landing beyond the end of a line.
^X	**Cursor Down Line.** Moves the cursor down to the next screen line. The cursor remains as nearly as possible in the same print column; moves left if necessary to avoid landing beyond the end of a file line.
^A	**Cursor Left Word.** Moves the cursor back to the beginning of a word. See exact definition of "word" after this table.
^F	**Cursor Right Word.** Moves the cursor forward to the beginning of the next word. This is a fast way to get the cursor to the desired position in a line.
^QS	**Cursor to Left Side.** Moves the cursor to the leftmost column of the current screen line.
^QD	**Cursor to Right Side.** Moves the cursor right to the position after the last character displayed on the current screen line; usually this is not the right edge of the screen.
^QE	**Cursor to Top.** Moves the cursor to the top line of the text area, remaining as nearly as possible in the same column.
^QX	**Cursor to Bottom.** Moves the cursor to the bottom line of the text area (similar to ^QE).
^QR	**Cursor to Beginning of File.** Moves the cursor to the beginning of the document. For a long document, doing a save (^KS) is faster and uses less diskette temporary file space if the cursor is currently near the end of the document.

Table 3-1. Cursor Motion Commands (Continued)

Command	Description
^QC	**Cursor to End of File.** Moves the cursor to the position after the last character of the document.
^Q0-9	**Cursor to Place Marker.** Moves the cursor to one of ten "place markers". Place markers are set by the operator with the commands ^K0 through ^K9 (see Section 5).
^QB	**Cursor to Beginning of Block.** Moves the cursor to the beginning of the marked block, and displays the marker if it is presently undisplayed. Blocks are described in Section 6.
^QK	**Cursor to End of Block.** Moves the cursor to the end of the currently marked block, similarly.
^QP	**Cursor to Position Before Previous Command.** Moves the cursor to its position before the preceding command. This command is particularly useful after saves, to get back to where you were editing, and after ^B (paragraph reform), to get back to the point where you were making changes.
^QV	**Cursor to Start of Last Find. Cursor to Source of Last Block.** Moves the cursor to its position before the last Find or Replace command (Section 5) or to the position of the source of the last block of text moved, copied, or deleted (Section 6), whichever has been used most recently.

Definition of a "Word"

For the purposes of the word left and word right commands (^A and ^F) and the delete word command (^T), a "word" is defined to include one punctuation character (. , : ; ! or ?) at the end, if present, and any number of following spaces and tabs. Words may be separated by commas (for example) without spaces, and the cursor will come to rest after each comma. A carriage return is also treated as though it were a word, that is, the cursor will stop at the end of each line as well as at the beginning of each word in each line.

Where the Cursor Won't Go

The cursor can be moved **only onto characters present in the file,** or to the position immediately after the last character of a file line. This latter position corresponds to being "on" the carriage return between lines.   Recall that lines in the file are stored in variable length, with "carriage return" characters separating them. There is usually blank space on the screen to the right of each line for which the file contains no characters.   The cursor cannot be moved into this space with the cursor motion commands.

To get the cursor to go beyond the actual characters at the right of the end
of a line, the line must be extended. Put the cursor at the end of the line
(^QD), then space or tab over to the desired column. If insertion is off, you
can tab over without bothering with the ^QD. The tab key (^I) acts like a
cursor motion command when the cursor is over existing characters, but extends
the line with spaces upon reaching the end of the existing text.

Usually you will find that the cursor can be moved one or two more columns to
the right of the last character visible on a line. This just means that there
are one or two "space" characters in the file between the last visible charac-
ter and the carriage return.

The cursor will not move beyond the position after the last character in the
file, nor move to a position before the beginning of the file.

The cursor will not come to rest in "markers" (see Section 5), nor in page
break display lines (—————————P), as these are display items that do not
represent file characters.

The cursor will come to rest only on the first display character of a file
character displayed with multiple characters (see Section 2). This occurs
with respect to print control characters entered into the file to control
enhancements such as underline, and with the (non-document) fixed "tab" char-
acters, if you use them (Section 6).

How the Cursor Moves

HORIZONTAL MOTION

"Horizontal" cursor motion follows the characters in the working document,
wrapping to beginning (left) of the next line when moved to the right from the
end of a line, or to the end (right) of the preceding line when moved to the
left from the beginning of a line. For example, successive "cursor right"
(^D) commands move the cursor to the right until the end of the line is
reached, then the next ^D moves the cursor to the **beginning** of the next screen
line, at the left edge of the screen.

Horizontal cursor motion moves extra positions as necessary to avoid landing
in a place the cursor won't go, such as on the letter of a control character
displayed as ^-letter, or on a display item that does not represent a file
character, such as a marker or a page break line.

Starting with release 3.0, lines of a WordStar document wider than 80 columns
will be displayed on a single line, rather than wrapped to a second or third
line.   When the document first appears, only characters in columns 1-79 will
be shown on the screen. However, as you attempt to move the cursor beyond
column 79, the line in which the cursor rests will shift left 20 columns.
(This number can be changed from 20 to another value if desired.) After about
one second, the rest of the line in view will also shift left. The lines on
the screen shift similarly to the right any time you move the cursor back to a
column beyond the left side of the screen.

Any time the margin is beyond the rightmost column that is visible on the
screen, the ruler line will display a + at the right side of the screen.
Flags displayed at the right side of the screen will have the same meanings as
indicated in Table 2-2, even though the actual right margin is not in view.

For the purpose of scrolling horizontally, print control characters in the file are counted, even though they are not counted for the purpose of printing. With horizontal scrolling, it is possible to have a line more than 240 columns wide. (The limit is about 32,000 columns.)

VERTICAL MOTION

Vertical cursor motion keeps the cursor in the same **print** column, or as near to it as possible. When the destination line is long enough, the cursor will usually move straight up or down, but it may jog left or right according to the "same print column" rule if one of the lines contains one or more print control characters. The print control characters, described in Section 7, display as a caret (^) and a letter (two columns), but don't print (or print in one column only).

If the cursor is moved up (^E) or down (^X) and the destination line is shorter, the cursor will move left as necessary to avoid landing beyond the end of the line. The cursor also moves sidewise, if necessary, to avoid landing in any of the other forbidden places previously described. It will move vertically an additional line if necessary to skip over a page break line.

ATTEMPTING TO MOVE OFF THE SCREEN

When a command moves the cursor to a character not displayed on the screen, the screen display is scrolled to bring the cursor destination onto the screen. For example, if the cursor is already on the top display line, a "cursor up" (^E) will move the file display down a line in order to give the cursor a place to go.

Commands that scroll the file display up or down also move the cursor to a different line if necessary to keep it on the screen.

The cursor is also kept out of the bottom line of the screen by scrolling the file display or moving the cursor up when necessary. This makes the next line always visible when text is being altered, reducing the chance of inadvertently typing over it.

ATTEMPTING TO MOVE OUT OF THE FILE

Any attempt to move the cursor beyond the end of the file or before the beginning of the file leaves the cursor unmoved. Add lines to the file if you wish to move above the beginning or below the end.

SCROLLING

The scrolling commands change the text displayed on the screen, without necessarily moving the cursor; these commands are commonly used to bring the desired text into view.

The cursor motion commands (previous section) also move the document on the screen, but only when necessary to keep the cursor destination in the display area.

Table 3-2.   Scrolling Commands

Command	Description
^Z	**Scroll Up One Line.** Scrolls the file display (or directory) up one line: a line disappears off the top of the screen and a line is added at the bottom.
^W	**Scroll Down One Line.** Scrolls the file display (or directory) down one line.
^C	**Scroll Up One "Screenful".** Moves the display up by a "screenful", showing additional lines toward end of file. Cursor remains in same screen line, as nearly as possible to the same column. Actual motion is about 3/4 the number of displayed lines, so that there is some overlap between successive "screenfuls".
^R	**Scroll Down One "Screenful".** Moves the display down a "screenful."
^QZ	**Continuous Scroll Up.** Starts moving the screen display up continuously, a line at a time.
^QW	**Continuous Scroll Down.** Starts moving the screen display down continuously, a line at a time.

Scrolling (^Z and ^W)

For upward scrolling (downward file motion), the cursor line is moved down only if it is already in the top line of the text area; otherwise the cursor remains on the same character. However, if the file directory (see ^KF, Section 6) is displayed and there are additional lines of file names below the partial directory shown on the screen, ^Z will scroll the directory up one line and leave the file display unchanged.

Continuous Scrolling (^QZ and ^QW)

Whenever you initiate continuous scrolling, WordStar displays

> TYPE 1-9 TO VARY SPEED, SPACE TO STOP

Press 1 for fastest scrolling, 9 for slowest. The default speed is initially 3. Press any other key to stop the screen motion.

TEXT ENTRY

Generally, text entry is accomplished simply by typing the text. However, related commands are used to control whether the text inserts or overtypes existing text, to control the forming of text into lines by word wrap, to indicate paragraph endings, or to "tab" to preset tab stops, etc.

The basic commands for entering text are shown in Table 3-3, with more detailed explanations of some commands in the paragraphs that follow. Additional commands and extensive discussion of on-screen text formatting for word

processing purposes are given in Section 4, after presentation of deletion and saving commands.

<p align="center">Table 3-3. Basic Commands for Entering Text</p>

Command	Description
^V	**Insertion ON/OFF.** Determines whether characters typed are inserted into current line, or replace (overtype) characters already in line. Press once to turn insertion OFF, and again to turn insertion back ON. When on, INSERT ON shows in status line.
RETURN	**End Paragraph.** With insertion ON, RETURN inserts a hard carriage return in the file; with insertion OFF, RETURN makes the carriage return at the end of the line "hard" if it is "soft", then moves the cursor to the beginning of the next file line.
^N	**Insert "Hard" Carriage Return.** A "hard" carriage return is inserted at the cursor position and the cursor is left in front of it; that is, the cursor is not moved. Text to the right of or below the cursor moves down.
^I	**Tab.** Advance to the next tab stop. If there are no more tab stops on the current line, go to next line. Only tab stops set within the margins are used unless word wrap is off or margins are released.
^OI	**Set Variable Tab.** Sets either an ordinary or a decimal tab stop (see Section 4).
^ON	**Clear Variable Tab.** Clears a tab stop (see Section 4).
^OF	**Set Tabs and Margins from "Ruler" Line in File.** Allows you to type a line of symbols in your file to be used to set tabs and margins (see Section 4).
^Px	**Enter Control Character.** ^P followed by a letter (x) enters the corresponding control character into the file; any other character except space is entered exactly as typed. This permits entering control characters that normally have command functions. For example, ^P^S or ^PS will enter a CTRL S (^S) into the document.

End Paragraph (RETURN)

If the line spacing is set to 2 when you press RETURN, two returns are inserted or two lines moved down over, etc. RETURN should not normally be used between the lines of a paragraph; let word wrap form the lines instead.

RETURN with insertion ON will split a line into two if the cursor is in midline, or produce a blank line if the cursor is at the beginning or the end of a line.

RETURN with insertion OFF may be used to change a soft carriage return to hard; for example after deleting the last line or lines of a paragraph.

Insert "Hard" Carriage Return (^N)

Depending on the cursor position, ^N will create a blank line (cursor at beginning or end of line) or split a line into two lines (cursor in mid-line).

Comparison of RETURN and ^N

Note the following differences between inserting a carriage return with RETURN and inserting a carriage return with ^N:

- ^N makes an insertion whether insertion is ON or OFF; RETURN makes an insertion only when insertion is ON.

- ^N leaves the cursor before the inserted carriage return; RETURN leaves the cursor after the carriage return.

- ^N always single spaces; RETURN inserts multiple returns (or moves multiple lines) if the line spacing (^OS) is set greater than 1.

Generally, RETURN is the more convenient key to use when paragraph ends or blank lines are needed in the course of continuous text entry. ^N is a convenient way to make a blank line or lines into which to type a paragraph to be inserted. Using ^N first makes sure the new line or paragraph ends in a "hard" carriage return even if you forget to type RETURN at the end; only a single ^N is necessary before entering a paragraph of any length under word wrap. Experienced users find ^N extremely useful in correcting text already entered.

Tab (^I)

The tab function works one way when insertion is ON and another way when it is OFF:

Insertion ON: Tab inserts spaces, and possibly a "hard" carriage return, to reach next tab stop. Text after the cursor moves ahead.

Insertion OFF: Tab moves the cursor over existing text; if there is no more existing text and the next tab stop is on the current line, the line is extended with spaces; if there are no more tab stops on the current line, WordStar inserts a "hard carriage return" and moves the cursor to a new line.

Note that the tab key (with insertion ON, or cursor beyond end of line; and variable tabbing on) enters regular space characters into the file. These will be subsequently edited just as if they had been entered with the space bar.

Each tab stop may be regular or "decimal". After you tab to a "decimal" stop, text moves left as entered until "." is pressed, aligning the data so the point is at the tab stop. See Section 4.

For tab operation with variable tabbing turned off (^OT command), see "Fixed Tabbing Mode," Section 6.

Enter Control Character (^Px)

^P is used to enter "print control characters" for underlining, boldface,
subscripting, etc. into the document. These characters are fully described in
Section 7 and summarized in the Print Menu. ^P- may also be used to enter a
"hard" (regular) hyphen when "soft hyphen entry" is on (see ^OE, Section 4).
In addition, ^P may be used to key in any code (1-7F hex) that your keyboard
can generate, for special (non-document) purposes. The character entered with
^P will insert or overtype, depending on whether insertion is ON or OFF.
Table 3-4 summarizes some of the uses of ^P.

Table 3-4. Some Uses for ^P

Command	Description
^P-	**Enter Hard Hyphen.**Always enters a "hard" (regular) — even if soft hyphen entry (^OE) is on or ^B (with hyphen-help, ^OH, on) is pausing to allow hyphenation.
^PO	**Enter Non-Break Space.** Enter a control-O into the file at points where you want a space to print but you do not want the line wrapped or spaces inserted for justification.
^PH	**Strikeover.** Causes the next character to overprint the preceding character, i.e. to print in the same position. Strikeover displays as ^H.
^P RETURN or ^PM	**Enter Overprint Line.** Enters "carriage return" code without "line feed" overprint code into file, causing the LINE entered immediately after "^P RETURN" to OVERPRINT the preceding line. A hyphen (-) appears in rightmost column of screen to indicate that next line overprints line with hyphen (-).

Overprint Lines (^P RETURN or ^PM)

Overprint lines may be used to produce special effects, by printing multiple
characters in the same column position. The ^P command is fully described in
Section 7.

Other Commands

Many other commands influence the on-screen formatting of text. Read Section
4 for full descriptions; refer to the Onscreen Menu for a brief summary.

Hints for Entering Tables

Set the margins wider than the table and clear all tab stops. Set a tab stop
for each desired column. Press the TAB key after entering each field. Tab-
bing after the last item on each line will automatically take you to the first
field on the next line. Setting the margins and tab stops is discussed in
Section 4 under the subheading "Setting Tab Stops and Margins".

If the table is not at the end of the file, check that insert is ON before entering the table, or use ^N to make a number of blank lines for the table.

To ensure that the table prints with the columns aligned as they appear on the screen (even if ^B or word wrap is used accidentally), place a .UJ OFF dot command just before the table to turn microjustification OFF. If .UJ OFF is **not** used, and a line in the table is word-wrapped or reformed with ^B (Section 4), the line may not print exactly as it appears on the screen. Remember to use .UJ ON at the end of the table to turn microjustification back on.

TEXT DELETION

The commands shown in Table 3-5 are used to remove text from the document.

Table 3-5. Deletion Commands

Command	Description
^G	**Delete Character.** Deletes the character at the cursor position. If the cursor is at the end of a line, deletes the carriage return, joining two lines.
DELETE	**Delete Character Left.** Deletes the character immediately left of the cursor. If the cursor is at the beginning of a line, deletes carriage return, joining the current line onto the preceding line. DELETE, DEL, RUB and RUBOUT are alternate labelings of the same key. The code "^_" (1F hex) is generated by some keyboards if the CTRL key is held while DELETE is pressed. The latter code is accepted to make it unnecessary to release the CTRL key or (on some keyboards) move to the SHIFT key before rubbing out characters.
^T	**Delete Word Right.** Deletes the word containing the cursor, and following spaces. If the cursor is in mid-word, ^T deletes only that portion of the word at and to the right of the cursor. If the cursor is between words, ^T deletes only the spaces up to the next word. If the cursor is at the end of a line, ^T deletes the carriage return and any spaces following. See "Definition of a Word" earlier in this section.
^Y	**Delete Line.** Deletes the entire line on and off the screen in which the cursor is resting. with any associated overprint lines. The lines that follow move up on the screen.
^QY	**Delete to End of Line.** Deletes from the cursor position rightward in the line in which the cursor is resting. Does not delete carriage return at end line, nor overprint lines.
^Q DEL	**Delete to Beginning of Line.** Deletes leftward to the beginning of the line (like ^QY). (See DELETE in this table for other key names.)
^KY	**Delete Block.** Deletes the currently marked block of text. See "Block Operations", Section 6.

SAVING AND ABANDONING

A document that you are entering or changing is not permanently stored until "saved" on diskette. Furthermore, only a disk-saved document can be printed. The commands for saving (and abandoning) files are shown in Table 3-6.

Table 3-6. Saving and Abandoning Commands

Command	Description
^KS	**Save File and Resume.** Saves the document and initiates re-edit: short for ^KD followed by another D (or N) command for same file. Cursor is left at beginning of file; to restore cursor to previous position, enter ^QP as the next command.
	Use ^KS frequently to save your work so far, then continue editing the same document. Also, this command is the fastest way to get the cursor from the end to the beginning of extremely long files.
^KD	**Save File--Done.** Saves the document and goes to the no-file menu.
^KX	**Save File and Exit.** Saves the document and exits from WordStar to the operating system.
^KQ	**Abandon File.** Terminates editing of this file without saving the new version. Asks for yes-no confirmation if changes have been made; goes to the no-file menu after termination.
	Use ^KQ when you do not want the changes saved; also useful when no changes have been made, as after "editing" a file to inspect the document on the screen.

Every editing session whose results you want to keep must be ended with one of the "save" commands; a save must be issued during editing if you want to print what you have done so far; saving frequently during long sessions is advisable to guard against power failures, computer breakdown, or catastrophic command errors.

WordStar provides a "save and resume" (^KS) command to save your work so far, then continue editing. This eliminates the need to enter a "D" command after saving, and is a convenience for saving periodically during long sessions or saving to permit printing the text entered so far. After this save, if the help level is not 0, WordStar displays a message reminding you that the ^QP command may be used to return the cursor to its position before the save.

Note

Until saved, all changes made are temporary, and will be lost in the event of a power failure, computer crash, full diskette, etc. The ^KS command provides a convenient way to file and continue editing. Save early and save often!

After saving is completed, the original file (the one named in the "D" command
or after "WS" in the system command that calls up WordStar) will contain the
updated document, and a file with the same primary name but type BAK will
contain the previous version of the document. Note that only ONE .BAK file is
kept. Multiple saves, including ^KS's, will lose the original input file. The
General Information Manual describes file changes because of a "save."

After saving with the ^KD command, the no-file menu is displayed. You may
then edit another file, print a file, or perform other commands. It is thus
possible to edit several files in succession without re-invoking WS for each
one.

The commands in this section relate to saving (filing) the document being
edited under the file name it came from. The ADDITIONAL FILE COMMANDS,
described in Section 6, permit other file-related operations such as writing
part or all of the document on a file with a different name, merging files,
and splitting a file into several files.

Section 4
On-Screen Text Formatting

FORMATTING COMMANDS

The commands for formatting text on the screen are shown in Table 4-1,
followed by detailed descriptions of some of the commands.

Table 4-1. On-Screen Text Formatting Commands

Command	Description
^OC	**Center Line.** Document line containing cursor is centered between current margins. Blanks at beginning and end of line are ignored.
^OL	**Set Left Margin.** Asks for left margin. Either enter a number 1-240 and press RETURN or press ESCAPE to use cursor column margin number (as shown in COL item in status line).
^OR	**Set Right Margin.** Asks for right margin; enter column number of rightmost column to use for text, or press ESCAPE key to use cursor column.
^OF	**Set Margins and Tabs from Ruler Line in File.** Sets left margin to position of leftmost non-blank character in line containing the cursor, and right margin to rightmost non-blank character. This is a convenient way to reset the margins to match those used in a particular paragraph (or in a specially typed line).
^OG	**Paragraph Tab.** Temporarily sets the left margin in one tab stop from its present setting. For example, if the left margin is set at 1 and there is a tab stop at column 6, typing ^OG once will temporarily move the left margin to column 6. Successive ^OG's will set the left margin to successive tab stops.
^OS	**Set Line Spacing.** Asks for a number and sets line spacing. Enter 2 for double spacing, 3 for triple spacing, etc. This spacing is used whenever word wrap wraps a line, by ^B, and when the RETURN key is pressed.
^B	**Reform Paragraph.** "Forms" existing text as it was formed during entry by word wrap (except with optional hyphen-help) to end of paragraph. Starting point is left margin of line containing cursor, or cursor position if to left of left margin. Ending point is next hard carriage return encountered, or form feed or end of file.
^OI	**Set Tab Stop.** Asks for column number at which to set a (variable) tab stop. An ! will appear in the ruler line to show the new tab stop. Enter an # to set a decimal tab stop. An # will appear in the ruler line. (^O TAB can also be used.)
^ON	**Clear Tab Stop(s).** Asks for column at which to clear tab stop; type "A" and RETURN to clear all tab stops.

Table 4-1. On-Screen Text Formatting Commands (Continued)

Command	Description
^I	**Tab.** Moves cursor or inserts spaces to next tab stop on line; if none, goes to first tab stop on next line. Unless word wrap is off or margins are released, only tab stops between the margins are used. Fully described in Section 3 for the variable (normal) mode. (TAB may also be used.)
	For Decimal Tabs, see explanation later in this section.
^OX	**Margin Release.** Margins are released until the cursor has gone outside of margins then returned to between margins. MAR REL appears in status line while in effect. If margin release is already in effect, another ^OX unreleases. Margin release has the same effect as turning word wrap off except that margin release terminates automatically.

Onscreen Menu Display (^O)

The Onscreen Menu shows whether the following features are currently ON or OFF:

Hyphen-help	Justification
Variable tabbing	Print control display
Page break display	Soft hyphen entry
Word Wrap	Ruler display

Setting the Margins (^OL and ^OR)

The left and right margins should be set to the desired values whenever text is being entered (unless word wrap is turned OFF), and whenever the reform paragraph command (^B) is used.

Setting Ruler Lines (^OF)

The ^OF command also sets tab stops at any columns containing an !, or decimal tab stops at any columns containing an #, and clears tab stops at columns containing a hyphen (-). Thus a "ruler" for tab stops and margins may be entered into the file, as discussed later in this section.

Setting Paragraph Tabs (^OG)

The margin set with ^OG is temporary; it will remain in effect only until RETURN is pressed, another margin command is entered, or the cursor is moved to a location in front of the place where ^OG was typed. On terminals with highlighting, the ruler at the top of the screen will display un-highlighted to the left of the temporary left margin set with ^OG.

Reforming a Paragraph (^B)

The ^B command may be used to reform text after making insertions or deletions. The ^B command may also be used to change margins, to change line spacing, to justify or unjustify the text, and/or to assist in hyphenation.

Set the desired parameters, position the cursor in the first line to be altered, and type ^B. Upon completion, ^B leaves the cursor after the hard carriage return (paragraph end) that terminated the reform operation.

If Hyphen-Help (^OH) is ON, the ^B command may pause to allow a hyphen to be entered to split a word between lines. To hyphenate, move the cursor if desired, then press the hyphen (-) key. To continue reforming without hyphenating, type ^B.

Additional description of the ^B command follows later in this section.

TOGGLE KEYS

The toggle keys for formatting are shown in Table 4-2, followed by detailed descriptions of some of the toggles.

Table 4-2. Formatting Toggle Keys

Command	Description
^OW	**Word Wrap ON/OFF.** Turns word wrap off if currently on; turns word wrap on if currently off. Turning word wrap off also activates any tab stops outside the current margins. Word wrap is described in detail after this table.
^OJ	**Justification ON/OFF.** When ON, "soft" spaces are inserted in each line formed by word wrap or ^B to bring the right end of each line out to the exact margin; when off, no "soft" spaces are inserted (and any already present are removed), leaving text "ragged right".
^OV	**Variable Tabbing ON/OFF.** When ON, WordStar's variable tab stops are in effect, and spaces are entered into file for tabs. When OFF, the description under "Fixed Tabbing Mode" in Section 6 applies. Should normally be left on for word processing use. Note: when turned OFF, the ruler line continues to show the variable tab stops.
^OT	**Ruler Line ON/OFF.** Turns display of the "ruler" line showing margins and tab stops off and on.
^OP	**Page Break Display ON/OFF.** Controls display of page break lines ―――――――――P in file display area of screen and PAGE and LINE items in status line.
^OD	**Print Control Display ON/OFF.** Controls display of control characters which do not print. Turn OFF to make the screen look more like printout when checking text; keep on while editing. Turning ^OD off greatly improves visualization of text containing many print controls. Always turn ^OD back ON before editing. If textual changes are made with print control display off, the print controls will usually remain in their old places, which will usually yield undesired results.

Table 4-2. Formatting Toggle Keys (Continued)

Command	Description
^OH	**Hyphen-Help ON/OFF.** When Hyphen-Help is ON, the ^B command (reform paragraph) will pause upon encountering a long word that does not quite fit on the line. The operator may then position the cursor (which indicates where the hyphen will be placed) and press the hyphen (-) key to insert a (soft) hyphen and continue reforming, or press ^B to continue reforming without hyphenating.
^OE	**Soft Hyphen Entry ON/OFF.** When soft hyphen entry is ON, the "-" key always enters a "soft" hyphen, rather than a regular (hard) hyphen or dash. A soft hyphen is a hyphen that will print ONLY if word wrap or paragraph reform (^B) leaves it at the end of a line.

Page Break Display Toggle (^OP)

When page break display is off, FC=ccccc and FL=lll display in status line as described in Section 2. By moving the cursor to the end of file and reading the FC= item, you can determine file size.

Print Control Display Toggle (^OD)

Note the following points when ^OD is OFF,

- those soft hyphens (see ^OE in this table) which will not print do not display;

- the "non-break-space" character (control-O) displays as a space, rather than "^O";

- other print controls do not display (see Section 7).

Soft Hyphen Entry Toggle (^OE)

Turning soft hyphen entry ON allows hyphenating words with the - key as text is entered; only the hyphens which fall at the end of line will print. Turning ^OE ON is not necessary to hyphenate when ^B pauses for hyphenation under hyphen-help. Soft hyphens display highlighted; the ^OD command (above) can be used to suppress display of soft hyphens which will not print. To enter a hard hyphen—even if ^OE is ON—type ^P -. When ^OE is ON, the hyphen (-) key also enters a soft hyphen into a file name, or a text to search for or substitute, or answering other questions asked by various WordStar commands. To enter a hyphen in a file name when ^OE is ON, type ^P -. See the additional description of soft hyphens in the text later in this section.

Note

Files containing soft hyphens will not print correctly with releases of WordStar earlier than 2.0.

Table 4-3. Defaults for Parameters

Item	Document Mode	Non-Document Mode
Left Margin	Column 1	Column 1
Right Margin	Column 65 (80-column screen) Column 60 (64-column screen)	Column 65 (80-column screen) Column 60 (64-column screen)
Variable Tab Stops	Cols. 6, 11, 16,..., 56	Cols. 9, 17, 25,..., 73
Variable Tabbing	ON	OFF
Word Wrap	ON	OFF
Justification	ON	OFF
Ruler Display	ON	OFF
Page Break Display	ON	Inoperative
Print Control Display	ON	ON
Soft Hyphen Entry	OFF	OFF
Hyphen-Help	ON	OFF

Any changes made in the items shown in Table 4-3 remain in effect as successive files are edited, except that all of the ON/OFF items are re-defaulted if an N edit follows a D edit, or vice versa.

ENTERING TEXT WITH WORD WRAP ON

Set the margins (^OL and ^OR, or ^OF) if you don't want to use the defaults. Turn justification off (^OJ) if you want ragged right, set the line spacing (^OS) for double or triple spacing if desired. On the first keystroke, indentation to the left margin (if not at column 1) will occur.

Each time you type beyond the right margin, the partial word that didn't fit on the line is moved down to the left margin on the next line, and the preceding line is justified (unless you selected ragged right). Within a paragraph, type without using the RETURN key, letting WordStar form the text into lines. Avoiding use of the return key in mid-paragraph is important: if you do use the RETURN key, the resulting "hard" carriage return will interfere with later paragraph reforming after corrections.

At the end of a paragraph, press the RETURN key. This will record a "hard" carriage return (fixed line break) in the file, indicated on the screen by a < in the rightmost column. If you want a blank line between paragraphs, press RETURN twice. Two RETURNS are all you need between block paragraphs. Anywhere else you want a fixed line break, as between lines of a list or a table, press the RETURN key.

Spaces in the Text

Any spaces you type are permanently kept in the file; they are termed "hard" spaces. To form indented paragraphs, type the desired number of spaces at the beginning of each paragraph. The first time you press the space bar, WordStar will indent to the left margin before entering your space, so that your space is in addition to those supplied by WordStar to get to the margin. The TAB (^I) key may also be used to begin indented paragraphs (with a stop set at the desired column (^OI)).

If you like two spaces after all periods, type that way. Your spaces will be kept. When a period falls at the end of a line, your spaces won't show on the screen but they will come back if later reforming makes the period fall in the middle of a line.

The spaces added to your text by indentation to the left margin, along with any added to the line during justification, are termed "soft" spaces. Soft spaces appear the same on the screen as hard spaces, but they are distinct to WordStar. If the line is later rejustified, or reformed to a new left margin, "soft" spaces will be selectively removed, but all spaces you entered (including with the TAB key) will be kept.

Releasing the Margins

Any time you want to enter something outside the margins, you may release the margin (^OX), move the cursor to the desired position, and enter the desired text. You don't need to release the margins in order to get the dot of a dot command line in column 1. Word wrap automatically disables whenever you are entering a period in column 1, or whenever the current line already contains a period in that column.

Print Control Characters

A formed line containing print control characters will appear to extend beyond the right margin on the screen. This is because the print controls occupy no character positions on the printed page; when printed, the line will be the correct length. (The print control characters, such as CTRL S to turn underlining on and off, are described in Section 7.) To view the text on the screen as it will print, you may turn off the display of print control characters with ^OD. Only the characters to be printed will then appear on the screen; a line containing print controls will appear the correct length. Be sure to turn print control display on again before continuing to edit.

HINTS FOR EDITING FORMATTED TEXT

Centering Lines

To center a line of text between the current margins, place the cursor anywhere in the line and type ^OC. This command deletes spaces and tabs at the beginning of the line and enters the appropriate number of hard spaces to center the line. In determining centering, spaces at the beginning and end of the text on the line are ignored.

Correcting Text within a Paragraph

First set the margins, line spacing, and justification to match the paragraph to be altered—if they are not already so set. The most convenient way to set the margins is to place the cursor in any full-length line in the paragraph, then type ^OF.

Then, change the text without worrying about the format. Position the cursor, delete text, insert new text, and turn insertion off (^V) to permit over-typing, as appropriate.

After you have the desired words in the paragraph, position the cursor in the first changed line (or the first line that looks messy), and type the para-graph reform command, ^B. The paragraph will be fixed up to look the same as if it had just been typed in with word wrap on, and the cursor will be left on the line immediately following the paragraph. You may notice that ^B stops part way through the paragraph and displays a message about hyphenation. This is hyphen-help, discussed further below. To continue without hyphenating, just type another ^B. To prevent such stops, turn hyphen-help off (^OH).

If you insert near the beginning of a line, the end of the line will move right, possibly even overflowing to the next screen line. This is OK. ^B will fix the overlong line. * When a line gets long enough to overflow onto the next screen line, a + appears in the rightmost column to indicate that the next screen line is part of the same document line. * (true for 3.0?) *

Of course, text correction can be intermixed with text entry as desired. For example, if you notice a misspelled word two lines back, cursor up to it, correct it, and type ^B to make sure that line and the following lines are correctly formed. A backspace (^S) after the ^B will usually replace the cursor at the end of the paragraph, where you were entering text.

Whenever you are altering a paragraph, make sure it ends up with a hard carriage return at the end. Sometimes deleting text at the end of a paragraph will leave it without one (no < in the rightmost column of the screen). To correct this, "harden" the carriage return by placing the cursor at the end of the line (^QD) and, with insertion off (^V), press RETURN. Alternate methods of inserting hard returns include RETURN with insertion on and ^N. After one of these, you will probably find there is an excess soft return (evidenced by a blank line on the screen) which you must delete (^G).

Inserting a Paragraph

To insert a new paragraph between two existing paragraphs, position cursor on the first line of the second paragraph at the left margin and type ^N. ^N inserts a "hard" carriage return and leaves the cursor in front of it. Thus, the return needed to terminate the paragraph is now in the file and follows the cursor, which is on a blank line. Type the body of the paragraph. As word wrap forms lines, the paragraph below is pushed down. Type additional ^N's (or RETURNs with insertion on) if necessary to get the desired number of blank lines between paragraphs.

Splitting a Paragraph

To split a paragraph into two, position cursor at desired division point. Type ^N. This splits the line and supplies a hard carriage return to terminate the first paragraph, leaving the cursor in the last line of the first paragraph. Now type ^B, to remove any justification spaces from the last line of the first paragraph (the last line of a paragraph is never justified). Type additional ^N's (or RETURNs with insertion on) if blank line(s) are desired between paragraphs. The second paragraph now begins with a partial line that is probably not indented correctly. Place the cursor at the beginning of this line, correct the number of spaces present (add spaces if you are using indented paragraphs; delete any leftover spaces for block paragraphs), then type ^B to reform the second paragraph.

Joining Two Paragraphs

To join two paragraphs into one, place the cursor at the end of the last line of the first paragraph. Type ^G's to eliminate all carriage returns between the paragraphs, joining the first line of the next paragraph onto the current line. The cursor will now be in the middle of a long line. Establish the correct number of spaces as desired at this point (presumably one or two after a period). To avoid confusion over soft and hard spaces, the surest procedure is to delete all spaces adjacent to the cursor, then insert the one or two desired. Now type ^B, to fix the long line and reform to the end of the paragraph.

Note

As noted earlier, the forming operation removes all "soft" spaces from the text at the start. There is an exception to this: whenever removing a soft space or soft carriage return would result in running two words together with no space or "-" between them, the forming operation inserts a hard space in order to avoid running words together. This simplifies editing by making it unnecessary to type a space after words added to the end of a line.

Changing Margins, Justification, or Line Spacing

Paragraph re-form (^B) works just as well for applying new settings to existing text as it does for applying the settings to modified text. Of course, it will also apply new settings to modified text. Set the desired margins, justification, and line spacing. You may wish to turn hyphen-help off (^OH) if you do not wish ^B to stop to hyphenate words. Put the cursor at the beginning of the paragraph and type ^B. The text will be reformed as specified, even unjustified if previously justified, without the need to reenter a single character.

For example, if you were to change the left margin to column 5, turn justification off, set the line spacing to 2, place the cursor at the beginning of the preceding paragraph, and type ^B, you would end up with the following example of ragged right text:

Paragraph re-form (^B) works just as well for applying new settings to

existing text as it does for applying the settings to modified text. Of

course, it will also apply new settings to modified text. Set the desired

margins, justification, and line spacing. You may wish to turn hyphen-

help off (^OH) if you do not wish ^B to stop to hyphenate words. Put the

cursor at the beginning of the paragraph and type ^B. The text will be

reformed as specified, even unjustified if previously justified, without

the need to reenter a single character.

Since paragraph re-form ^B starts with the line containing the cursor, it may
be used to change margins (or justification or line spacing), in mid-para-
graph. For example, you might want the text to get narrower in mid-paragraph
to leave a space for a diagram on one
side of the page. To produce such a
space, first form the entire paragraph to
the margins you desire for the first
portion. Then set the new margins, posi-
tion the cursor in the first line to have
the new margins, and type ^B again. That
line and succeeding lines will be re-
formed while the part above the cursor will remain unchanged. Additional
margin changes may be made by applying ^B as many times as desired, each time
starting farther down in the paragraph.

^B will help you hyphenate existing text if hyphen-help (^OH) is ON. As
explained under "Hyphen-Help" below, ^B with hyphen-help ON will stop whenever
a long word that appears to be a good candidate for hyphenation is encoun-
tered. You may press the hyphen (-) key to hyphenate and continue reforming,
or press ^B to continue without hyphenating (thus placing the word on the next
line. You may move the cursor (^S or ^D) before pressing the hyphen key (-).
Hyphens entered through hyphen-help are "soft", that is, they will not print
if later reforming places them in mid-line.

Cursor Position Before Reform

Paragraph re-form (^B) never shifts any text on the first line that is either
to the left of the cursor position or to the left of the left margin currently
set. This allows section numbers and outline numbers to remain left of the
margin when the paragraph is reformed, as discussed below.

When you wish to move a paragraph's left margin to the right, the cursor must
be placed to the left of all text on the first line before you type ^B;
otherwise, the text to the left of the cursor will not be moved rightward. In
other words, if the left margin of the paragraph as displayed on the screen is
to the left of the current left margin setting, be sure to place the cursor to
the left of all text on the first line (including any hard spaces used for
paragraph indentation) before typing ^B.

When the new left margin is set the same as, or to the left of, the left
margin of the paragraph to be re-formed, the cursor need not be positioned to
the left of the text on the first line.

Unless there is a section number or word outside the left margin, placing the cursor at the beginning of the first line to be reformed before typing ^B always works, and placing the cursor anywhere in the first line works unless the new left margin is set to the right of the left margin of the text as displayed.

Text to the Left of the Left Margin

The ^OG (paragraph tab) command is particularly useful when entering or reforming text where there is a section number, word, or other text left of the margin. This command temporily resets the left margin to the next tab stop.

1.   This paragraph was entered by typing the 1, a period, ^OG, then the text of the paragraph. The next tab stop was located in column 6, so ^OG temporarily set the left margin to column 6. The temporary margin remains in effect until the RETURN key is pressed, or until a cursor motion command is used to move the cursor out of the paragraph or before the position within the paragraph where ^OG was typed.

     a.   Each successive ^OG moves the left margin over one more tab stop. To enter a paragraph like this, type ^OG, then "a" and a period, followed by a second ^OG, then the text of the paragraph.

     b.   A convenient way to enter an outline is to set tab stops at all desired indentations, clear any other tab stops, and use multiple ^OG's to establish each indentation.

2.   You may also use ^OG to reset the left margin temporarily when reformatting a paragraph with ^B. Be sure to place the cursor to the right of any section number (or other text left of the left margin) before pressing ^B. The temporary margin will be released when the ^B is complete.

^OG is useful when the only text outside the margin is to the left of the first line of a paragraph. If you wish to enter text left of lines after the first line, or to the right of any line, of a formed paragraph, enter the paragraph first, then enter the text outside the margins with the margins released. For example, Table 4-2 has two columns, with formed text in the "Description" column. This table could be entered by setting the margins for the "Description" column, entering the command descriptions, then releasing the margins, turning insertion off, and typing the "Command" items.

Preventing Unwanted Micro-Justification

When printing text that has been "formed" with word wrap or paragraph reform (^B), WordStar will distribute the justification space evenly between the words on a line. This produces good appearance for paragraphs, but it can produce undesired results for tables or other text where the column alignment in the printout should be exactly as on the screen. Normally, such tabular text should not be reformed; word wrap should be prevented during entry of tabular text by setting the margins wider than the table and using the RETURN (or TAB) key between lines.

To ensure correct printing of columns of text, even if (inadvertently) word-wrapped or reformed, place the dot command .UJ OFF (Section 8) before the table. Type .UJ ON after the table to return to normal micro-justified printing. Further hints on entering tables are given in Section 3.

Hyphen-Help

Hyphen-help assists in improving the appearance of text by hyphenating long words that fall at the end of lines. With hyphen-help on, the paragraph reform command (^B) will identify long words that won't quite fit on a line, check that the word contains two syllables, roughly establish the proper place to hyphenate, then stop to allow the operator to indicate whether to hyphenate or not. Since the cursor may not be in exactly the right place for a hyphen, you can move the cursor one or more characters in either direction before pressing the hyphen key (-).

Hyphens entered via hyphen-help are "soft" hyphens; that is, they will not be printed if later reforming places them in the middle of a line, but they will remain in the file and be reactivated if further re-forming places them at the end of a line again.

To use hyphen-help, make sure that ^OH is on (press ^O and look at the menu to check), make sure the margins, line spacing, and justification are set as desired, place the cursor at the beginning of the paragraph, and press ^B. When ^B finds a likely place to hyphenate, reforming stops and the following message is displayed at the top of the screen (except at help level 0):

     TO HYPHENATE, PRESS -. Before pressing -, you may
          move cursor: ^S=cursor left, ^D=cursor right.
     If hyphenation not desired, type ^B.

The cursor will be on the character before which WordStar suggests inserting a hyphen. To hyphenate where the cursor is, press the - key. A "soft" hyphen will be inserted--regardless whether soft hyphen entry (^OE) and insertion (^V) are ON or OFF--and reforming will continue. If you wish to adjust the hyphen position, move the cursor left or right, then press -. If you do not wish to hyphenate the word, just press ^B, and reforming will continue, placing at the beginning of the next line the un-hyphenated word.

While the above message is on the screen, other commands may be used, such as ^Z to bring additional text into view. However, if the cursor is moved out of the word or right of the margin, or if a character other than the hyphen (-) key is entered, the message will clear and the hyphen (-) key will lose its special meaning. (If for some reason you wish to enter a regular (hard) hyphen while the above hyphen-pause message is on the screen, be sure to type ^P-, not just -.)

^B may stop for hyphenation and display the message shown above several times while one paragraph is being reformed — one such pause occurs for each word which WordStar considers a good candidate for hyphenation. If you do not wish to hyphenate, you may turn hyphen-help off (^OH) to prevent such pauses.

Even with hyphen-help ON, ^B may complete with no hyphenation pauses. This is normal; it indicates the paragraph contains no words which WordStar considers good candidates for hyphenation. ^B will not concern itself (or you) with words that fall in mid-line, with words with too few characters for the line being formed, with words that appear to have only one syllable, or with words whose entire first syllable does not appear to fit on the line. If you wish to hyphenate even in cases where ^B does not stop, it is possible to enter soft hyphens explicitly, as described in the next subsection.

Hard and Soft Hyphens

WordStar supports two kinds of hyphen characters: regular (hard) hyphens which always print, and "soft" hyphens which indicate syllable breaks where a word may be divided between lines (and a - printed), but where no hyphen should print if the entire word is placed on the same line.

SOFT HYPHENS

Soft hyphens display as a -; on terminals with highlighting the - will be dim or in inverse video. Once a soft hyphen is entered into the file, it always remains (unless explicitly deleted), but it may be activated (printed) or deactivated any time the line containing it is formed. Whenever word wrap or paragraph reform (^B) encounters a soft hyphen, the soft hyphen is set to print if it falls at the end of a line (if the soft hyphen is used as a place to divide the word between lines); otherwise, it is set not to print.

Soft hyphens are set to print or not print **only during line-forming.** Thus, if you make changes in the file (particularly the insertion or deletion of carriage returns after soft hyphens), and neglect to type ^B, you may get a hyphen that prints when it shouldn't or vice versa.

You can verify which soft hyphens will print by turning off display of print controls (^OD). Those soft hyphens which will not print will disappear from the screen. Be sure to turn ^OD back on before attempting to edit.

Soft hyphens are commonly entered using ^B with hyphen-help on, as described under the preceding subheading.

Soft hyphens may also be entered explicitly, by turning on soft hyphen entry (^OE), then pressing the hyphen (-) key whenever a soft hyphen is desired. For convenience, soft hyphens entered with the hyphen (-) key are always inserted even if insertion (^V) is off. Each soft hyphen entered with the hyphen (-) key is initially a non-printing soft hyphen; the soft hyphen will be set to print if word wrap or ^B subsequently breaks the word at the soft hyphen. After adding a soft hyphen to existing text, be sure to reform (^B) if you want the soft hyphen to print.

When soft hyphen entry is ON, you must either type ^P- or turn ^OE off to enter a regular - (hard hyphen) into the file. One of these methods may also be used for the answer to a question asked by a WordStar command, such as a text to search for or a file name. Ordinarily, you should leave ^OE OFF.

Soft hyphens may also be entered with the replace command (Section 5). For example, you may selectively change hard -'s (type ^P-) to soft hyphens (press - with ^OE on), or substitute soft hyphens into all occurrences of a long word. Be sure to reform (^B) after each such replacement.

Caution

Do not use a release of WordStar earlier than 2.0 to print text containing soft hyphens. A pre-2.0 WordStar will print ^^ or ^- for every soft hyphen encountered in the text.

HARD HYPHENS

Hard hyphens (regular -'s) are used whenever a - that always prints is desired, as in a word like hyphen-help or where a dash (--) is desired. A hard hyphen can be entered by pressing the hyphen key (-), unless ^OE is on or ^B is pausing for hyphenation (i.e., the prompt shown above under "Hyphen-Help" is displayed). A hard hyphen can always be entered by pressing ^P, then -.

Line-forming (^B or word wrap) will break a word at a hard hyphen if the hyphen happens to fall at the end of the line. However, unlike a soft hyphen, the hard hyphen will still be printed even if later reforming places the hyphen in the middle of a line.

Setting Tab Stops and Margins

The commands for setting the margins (^OL and ^OR) and for setting and clearing tab stops (^OI and ^ON) all ask for a column number.

For example, ^OL asks:

   LEFT MARGIN COLUMN NUMBER (ESCAPE for cursor column)? █

To set the left margin (in our example) by column number, type the desired column number and RETURN. To use the cursor column (as shown in the status line), just press the ESCAPE key. To keep the same margin (i.e., to cancel an unintended command), press RETURN, or press ^U, the WordStar "interrupt" key.

To set the margins to match an existing line of text, position the cursor anywhere in this line and type ^OF. This is the most convenient method of setting the margins to match an existing (justified) paragraph, before making changes in the paragraph; this procedure may also alter the tab stops if there happen to be any !'s, #'s, or -'s in the line.

To set and clear individual tab stops, ^OI and ^ON are convenient.

Using "Rulers" in Your Document

To set the desired tab stops and clear all others, and set the margins at the same time, you may prefer to use a "ruler" line. Type a line into the document with

   !   at each column where a regular tab is to be set

   #   at each column where a decimal tab is to be set (next subsection)

   -    in all other columns between the left and right margins

        These must be hard hyphens; be sure soft hyphen entry (^OE) is OFF
        before entering them; check the ^O menu if not sure.)

Leaving the cursor anywhere in this line, type ^OF. The desired tabs and margins will be set, and all other tab stops cleared. To keep the ruler line from appearing in the printed document, turn it into a "comment" dot command (a line beginning with two periods).

For example, to set tabs at columns 10, 20, and 30, set the left margin to 5,
the right margin to 50, and clear any other tabs between columns 5 and 50,
enter the following into the file, then use ^OF:

       ——!————!————!——————————

To keep the ruler in usable but non-printing form in the file, so that the
tabs can be reset to these values whenever you wish to edit the table to which
they apply, make the ruler an OVERPRINT line in a comment dot command line:
position the cursor at the beginning of the line, turn insertion on, insert
two periods, then type ^P and RETURN (^PM also works).

For the above example, such a ruler should appear on the screen as follows.
Note the "-" in the rightmost column of the "comment" line. (This is an
overprint flag, not a hyphen.)

       ..   -
       ——!————!————!——— ——————   <

This gets the .. out of the ruler while still suppressing printout of the
ruler. To use the ruler, position the cursor in the ruler (not in the blank
comment line), and type ^OF.

Ruler lines are usually unnecessary for text other than tables, since the ^OF
command responds to any non-blank characters and the tab stops often don't
matter.

In summary, to enter a non-printing, reusable ruler line, position the cursor
at the beginning of a line. Type ^N if necessary, to make a blank line ending
in a RETURN. Type two periods, ^P, RETURN, space over to the desired left
margin, then type hyphens to the desired right margin, except !'s at columns
where tab stops are desired (or #'s for decimal tab stops, described in the
next subsection). Type ^OF to make the tabs and margins specified by the
ruler take effect.

Decimal Tabs

Decimal tabbing provides a quick and easy way to enter columns of numbers with
the decimal points aligned, and to enter other text requiring right-alignment
rather then the left-alignment produced by regular tabs. After you tab to a
decimal tab stop, characters entered will move to the left, pushing the entire
field over to maintain right-alignment to the tab stop column. The cursor
remains at the tab stop. When a period is typed, this right-aligning action
terminates; the cursor will move right if additional characters are entered.

Right-alignment also terminates when the RETURN key or the space bar is
pressed, when the TAB key is pressed again and the next tab stop is not
decimal, or if the cursor is moved out of the field. It is possible to move
the cursor around within the "field" (the non-blank characters left of the tab
stop) and make corrections; right-alignment will not terminate and WordStar
will keep the field properly aligned as characters are inserted and deleted,
provided that the cursor is kept within the field. Whenever right-alignment
is in effect, the word decimal appears in the status line.

Decimal numbers entered under decimal tab will be aligned with the decimal point in the column at which the tab stop was set. Texts not containing decimal points or periods (or spaces), if entered under decimal tab, will be aligned with the last character one column to the left of the tab stop.

Decimal tab stops can be set by using either of the methods for setting tab stops. With the ^OI command, type a # before typing the column number or pressing the ESCAPE key. When using a ruler, type a # instead of an ! at the tab stop column. The specified column should be the column in which you wish the decimal points to appear, or the column after the column in which you wish text not containing periods to end.

To edit text previously entered in a decimal tab field, make sure a decimal tab stop is still set at the proper column, turn insertion off (^V), and bring the cursor to the tab stop with the tab key. This will restore right-alignment and make the word decimal appear in the status line. You may then move the cursor around as desired within the field and delete, replace, or insert characters as desired. (Once you have tabbed to the field, you may then turn insertion back ON again.) WordStar will maintain the alignment by moving the characters in the field to the left of the cursor—left or right as required.

If you fill up a decimal field by entering enough characters to fill all the blank space to the left of the cursor, right-alignment will cease until you delete the excess characters.

Decimal tabbing is only active when variable tabbing is ON (the default). To verify, press ^O and check the menu; ^OV turns variable tabbing ON.

As with regular tabs, no permanent record of the decimal tab columns is made in the file. You must reset the tab stops before entering additional information or editing text previously entered (with automatic right-alignment).

<center>**Note**</center>

You may wish to use a comma or some other character in place of a period to terminate "decimal" tabbing. WordStar has a provision for changing the "decimal point" character; see the list of patch items in the **Installation Manual.** If you have a European version of WordStar, the "decimal point" may already have been changed to a comma.

Text Wider Than the Screen

WordStar is not limited to the screen width in forming text. Users with wide printers, narrow screens, or who are preparing copy for photo-reduction can format text to widths up to 32,000 columns. There is no length limit for a manually formed line. However, if you are planning to type very long lines, remember that you should try to confine text manipulation to columns 1-240. Some WordStar functions do not work effectively beyond column 240.

Overprinting Characters

The strikeover character, entered by typing ^PH and displayed as ^H, provides a way to print two (or more) characters in the same position. For example, to print "à" as required in French, it is necessary (on a printer with regular

ASCII characters only) to print an "a" and a "`" in the same position. This
is accomplished by entering "`", backspace, "a" into the file. Type

    ``^PHa   (` CTRL-P H a)

    Screen display: ``^Ha   On paper: à

As another example, typing

    H^PHI^PHN^PHZ   (H   CTRL-P H   I   CTRL-P H   N CTRL-P H   Z)

will display

        H^HI^HN^HZ

and will print an H, an I, an N, and a Z in the same position

        ▉

producing the symbol used in this manual to represent the cursor.

Overprint Lines

One or more document lines which print on the same line can be used for
special effects. For example, another way to make the cursor symbols ▉ used
in this manual is to overprint an H, an I, an N, and a Z in the same position,
using three overprint lines to print the I, N, and Z over the H.

When an overprint line follows a dot command, it is considered part of the dot
command and is not printed. You can take advantage of this feature to keep
"rulers" for setting tabs and margins with the ^OF command in the file in a
form that will not print, but may be used with ^OF.

Overprint lines are entered by typing the first line, then typing a ^P before
the RETURN at the end of the line, then typing the line that is to print over.
To overprint a third line, type ^P RETURN again and type another line. The ^P
RETURN sequence enters a carriage return without line feed into the file.
Each screen line that will be overprinted by the following screen line will
show a "-" flag in its rightmost column.

Section 5
Finding Text

PLACE MARKERS

Place markers provide a convenient means of remembering one or more positions
in the document and for moving the cursor back to any one of these positions
later. Place markers are not stored in the file and are remembered only for
the duration of an edit. Previously entered place markers are not known if
the file is edited again later, although they do last through a "save and
resume" command (^KS). The commands for handling place markers are shown in
Table 5-1.

Table 5-1. Place Marker Commands

Command	Description
^K0-9	**Set Place Marker.** The marker indicated (0-9) is set to the cursor position. If the marker has already been set to this position and displayed, it will be undisplayed (but still set); otherwise it will be displayed as <n>.
^Q0-9	**Move to Place Marker.** The cursor is moved to the specified place marker (0-9). If the marker is hidden, it will be displayed; if the marker has not been set, an error message will be displayed.

There are ten place markers, numbered 0 through 9. Initially, all are
"unset." Any attempt to move the cursor to an unset place marker will produce
an error message.

A place marker can be **set** to the current cursor position by typing ^K followed
by one of the digits 0 through 9. · The marker will then be displayed as <n>
highlighted, at the set position, where n is the number. The marker display
<n> is not actually in the file; cursor motion commands will skip over it.

The cursor can be **moved to** any place marker already set by typing ^Q followed
by the number. The usual caution about long backward moves in extremely long
documents applies (Section 6).

If the cursor is already at a place marker, a place marker can be **hidden**
(removed from the screen display) by typing ^K followed by the number. The
position of the marker will still be remembered; if it is subsequently ac-
cessed (^Qn), it will reappear.

The beginning of block marker, <B> and the end-of-block marker, <K> can also
be set, hidden, and moved to in a similar manner (typing B or K instead of a
digit); these markers will be discussed further in Section 6.

FIND AND REPLACE

The commands used for Find and Replace are shown in Table 5-2, followed by detailed directions on how to use these commands.

Table 5-2. Find and Replace Commands

Command	Description
^QF	**Find a String.** Asks for a string to find. If you press ESC after typing the string, moves cursor beyond the next occurrence of string; if you press RETURN after typing the string, ^QF allows for options.
^QA	**Find and Replace.** Asks for a string to find, a string to replace it with, and options. If no options are given, the next occurrence of the find string after present cursor position is displayed and you are asked REPLACE (Y/N); if you type Y, replacement is performed.
^L	**Find or Replace Again.** The last Find or Replace command (whichever was more recently used) is repeated as though entered again with the identical response to all questions.
^QV	**Restore Cursor.** After a Find, Replace, or ^L command, moves cursor to its position before this command, or to the starting point of the last iteration if a repeat count or the G option was included in the command. Particularly useful after NOT FOUND errors.

Note

If certain other commands have been entered, ^QV has a
different meaning (see description above in Section 3).

Introduction

The Find command (^QF) provides a convenient way to move the cursor to a desired place in the file, without inspecting the entire file on the screen. Used in conjunction with the "Find/Replace again" command (^L), it also provides a convenient way to find all occurrences of a given word, phrase, or other string of characters. Use "Find" to find the first occurrence; observe it on the screen, and make changes if desired; then press ^L to advance the cursor to the next occurrence.

The Replace command (^QA) provides a convenient way to replace one word, phrase, or other string of characters with another word, phrase, or string, without explicitly positioning the cursor, deleting the old text, and typing in the new. By specifying the "global" option, you can replace all occurrences in the entire file with a single "Replace" command. Before actually making the substitution, Replace displays the text found and asks whether to replace it in this instance. This permits selective replacement. The asking can be suppressed for rapid substitution if desired.

The "Find/Replace Again" command (^L) may also be used to repeat a "Replace" command, allowing other editing commands to be used between replace's without re-entering the entire Replace command each time.

Replace has a number of convenient additional uses, such as inserting a commonly used string with a keystroke; several of these are described under the heading "Hints for Using Find and Replace" later in this section.

Basic Use of Find

Find is initiated by typing ^QF. WordStar then asks:

> FIND? ▉

This question appears below the menu, moving the top of the file display area down one line. Respond by entering any sequence of characters you wish to locate (the **find string**). then press RETURN. The find string may be a word, a phrase, a partial word, or any other string up to 30 characters. WordStar then asks:

> OPTIONS? (? FOR INFO) ▉

For now, just press RETURN; we will discuss this question shortly.

WordStar then searches forward through the file from the location of the cursor to the next occurrence of your find string. When a find occurs, the cursor is left after the last character of the string, the screen is redisplayed, and the command is complete. If the find string is not found, the cursor is left at the end of the document and an error message appears:

> *** NOT FOUND *** "<your find string>" *** Press ESC Key *** ▉

For example, suppose you have just started editing a document (cursor is at beginning of file) and you wish to move the cursor to the first place where the words "Section II" appear. Enter ^QF, then answer the questions thus (you type underlined text):

> FIND? <u>Section II</u>   RETURN   OPTIONS? (? FOR INFO)   RETURN

The basic Find command looks only for an **exact match** for the characters you enter as the find string: the above example would not find "Section II" (two spaces between words) or "section II" (lower case S).

The basic Find command will also locate the search string even if it is imbedded in other words. The above example would also find "Section III" if it occurred before "Section II"; an attempt to find "age" would also find the "age" in "page" or "agent" if one of these occurred first. Handling such an unwanted match is simple: just type ^L, and WordStar will repeat the Find, starting from the current cursor position and thus finding the next match.

Options described later in this section can modify the exact match rule.

Find ignores the distinction between hard and soft spaces and carriage returns.

If the find string is null (**RETURN** only entered), the cursor will not be moved. This lets you cancel an unwanted Find command by pressing **RETURN** in response to each question.

Basic Use of Replace

"Replace" does a "Find", then substitutes another string of characters for the find string, as specified.

Replace is initiated by typing ^QA. WordStar asks "FIND?" as for the Find command; after you have entered the find string, it asks:

REPLACE WITH? ▮

Type whatever you want substituted for the find string. WordStar then asks "OPTIONS? " as described above; respond by pressing **RETURN** only for now.

WordStar then searches for the find string, as described above. If it is not found, a **NOT FOUND** error occurs and the cursor will be at the end of the document. If found, text in the vicinity of the find is displayed on the screen and

REPLACE (Y/N):

appears in the status line. The cursor flashes back and forth between the string found and the question in the status line. If you want the substitution performed, type Y (y and ^Y also work). If not, press any other key.

To repeat the Replace command from the new cursor position with the same answers to all three questions, type ^L.

For example, to replace the next occurrence (after the cursor) of "Jones" with "Smith", you would type ^QA and answer the questions as follows:

FIND? <u>Jones</u> RETURN   REPLACE WITH? <u>Smith</u> RETURN   OPTIONS? RETURN

Find and Replace Options

The "OPTIONS?" question asked by Find and by Replace can be answered with one or more of the letters G, N, W, U, or B (in upper or lower case) a number between 1 and 65535, or a combination of these. Also, ? can be entered to request a menu summarizing the options, followed by reasking OPTIONS?. Terminate your answer by pressing the **RETURN** key.

The effect of each of these options is shown in Table 5-3

Table 5-3. Find and Replace Options

Option	Description
n	**Number (n).** Do the Find or Replace n times. For example, when used with Find, it means find the nth (say fourth) occurrence of the string. When used with Replace it means replace the next four occurrences. The number may be more than one digit. **NOT FOUND** error occurs if command cannot be performed that many times; as many Finds or Replaces as possible will have been done.

Table 5-3. Find and Replace Options (Continued)

Option	Description
G	**Global Search.** Do Replace on the entire file: move cursor to the beginning of the file, then replace repeatedly (asking each time) until no more occurrences are found. NOT FOUND error occurs only if no occurrences at all found. Cursor is left at the end of the file. If used with Find, finds the **last** occurrence in the file.
N	**Automatic Replace.** Replace without asking—convenient with G if you are sure there will be no undesired matches.
B	**Backward Search.** Search backward instead of forward from current cursor position. If NOT FOUND error occurs, cursor will be at beginning of file. If used with G, Finding or Replacing starts at end of file and proceeds to beginning.
U	**Ignore Upper/Lower Case.** Ignore the distinction between upper and lower case in the Find string; makes "age" also match "Age" or "AGE", etc. May be used with either Find or Replace.
W	**Whole Word Search.** Match on whole words only. Find or Replace only those occurrences of the find string that have a non-letter, non-digit character before and after them. Makes "age" NOT match "page" or "agent".

Note

W will not find occurrences of the Find string at the very beginning and end of the file; there must be at least one character (any character, including space, carriage return, etc) before and after the string.

One more point about the OPTIONS? question: if you end your entry to the preceding question (FIND? for the Find command, REPLACE WITH? for the Replace command) by pressing the ESCAPE key instead of the RETURN key, the options question will not be asked.

In the following examples of Find and Replace options, typed entries are underlined:

- FIND? <u>Jones</u>   RETURN   OPTIONS? (? FOR INFO) <u>13</u>   RETURN

  Finds the 13th occurrence of "Jones" after the present cursor position.

- FIND? <u>section</u>   RETURN   OPTIONS? (? FOR INFO) <u>wub</u>   RETURN

  Finds previous (b) occurrence of "section" as a separate word (w), in either upper or lower case (u). Will find "section" or "Section" or "SECTION", but not "dissection" or "sectional" or "sub-section".

● FIND? John Jones   RETURN   REPLACE WITH? James D. Smith   RETURN

    OPTIONS? (? FOR INFO) gn   RETURN

Changes all (g) "John Jones"'s in the document to "James D. Smith", without asking the operator whether to perform each substitution (n).

● FIND? carraige   RETURN   REPLACE WITH? carriage   RETURN

    OPTIONS? (? FOR INFO) gn   RETURN

Similarly correct the misspelled word "carriage" throughout the document.

Special Characters in the Find String

The control characters shown in Table 5-4 may be used in your response to the FIND? question (in either the Find or the Replace command) to match various classes of characters:

Table 5-4. Special Find Characters

Character	Description
^A	Matches any single character. (To enter ^A into the find string, type ^P^A.)
^S	Matches any character not a letter or digit. (Since ^S alone is used to delete a character from the string being entered, you must type ^P^S to enter a ^S in the find string.)
^Ox	Matches any character other than x, where x is any character entered immediately after the ^O.
^N	Matches the sequence "carriage return, line feed" (which is what is normally stored in the file between lines). The distinction between hard and soft carriage returns is ignored.
	^N also works in the answer to the REPLACE WITH? question. When used in the latter case, it produces a "hard" carriage return.

In addition, the question-response special characters described in Section 5 may be used: ^S, ^D, and ^Y to correct typing errors, ^P to put any control character into the string, ^R to restore the previous answer, etc.

Examples showing use of the special characters in Table 5-3:

● FIND? ^NSection II   RETURN   OPTIONS? (? FOR INFO)   RETURN

Finds "Section II" at the beginning of a line only.

● FIND? ^N   RETURN   OPTIONS? (? FOR INFO) 50   RETURN

Finds the 50th carriage return after the cursor line, that is, moves forward 50 lines in the file. If cursor is at beginning of file when this command is given, then it finds the 51st line.

- FIND? <u>^N^N</u>   RETURN   OPTIONS? (? FOR INFO)   RETURN

  Finds the next blank line (two adjacent carriage returns) and leaves cursor on following line.

- FIND? <u>X^A^AX</u>   RETURN   OPTIONS? (? FOR INFO)   RETURN

  Finds the next occurrence of two X's with any two characters between them, for example "XABX", "X1,X", "X +X", etc.

- FIND? <u>^N</u>   RETURN   REPLACE WITH? <u>|^N|</u>   RETURN
       OPTIONS? (? FOR INFO) <u>13n</u>   RETURN

  Without asking, change the next 13 carriage returns to "|, carriage return, |"; that is, add a | to the end of the current line and the next 12 lines, and insert a | at the beginning of the next 13 lines. This form of command is useful in forming boxes around tables.

                              Note

  In using the special find string characters, you must be aware of the fact that what is normally thought of as a "carriage return" between lines is actually two characters, a "carriage return" and a line feed; this fact impacts the use of ^A and ^S in the middle of a find string.

Finding and Replacing Soft Hyphens

As noted in Section 4, a "soft hyphen" is a special character at which a word may be split between lines. Soft hyphens are not printed unless left at the end of a line by word wrap or paragraph reform (^B).

If you turn soft hyphen entry ON (^OE), then you can press the "-" key while answering the FIND? or the REPLACE WITH? question will enter a soft hyphen into the answer. This permits searching for soft hyphens and adding soft hyphens to text using the Replace command. The Find command treats all soft hyphens the same, whether or not they are active (set to print). Soft hyphens added to text with the Replace command are initially inactive; they will not print unless subsequent line forming places them at the end of a line.

For example, the Replace command could be used to change all occurrences of the word "microcomputer" to "micro-com-puter". The -'s will be soft hyphens (and display highlighted) if soft hyphen entry (^OE) is on when ^QA is typed to initiate the Replace command. The soft hyphens thus added to the file will initially be non-printing; they will serve to tell ^B and word wrap where the word may be hyphenated in later line-forming. Usually, after adding soft hyphens, you will want to re-form the affected text with ^B to activate the soft hyphens.

When soft hyphen entry is on, you may press ^P then - to enter a hard hyphen (one that always prints).

Hints for Using Find and Replace

FINDING A LONG STRING

Usually it is handiest to type only part of the string (maybe 5 or 10 charac-
ters) in response to the FIND? question; if this results in finding the wrong
thing, press ^L to proceed to the next occurrence.

RESTORING THE CURSOR

To restore the cursor to the starting point after a NOT FOUND error, type ^QV.

GLOBAL REPLACE

Here are two approaches to making a global replace:

- Use the G option, with N if selective replace not desired.

- Move the cursor to the beginning of the document (^QR) and execute a
  Replace command for a single replacement only. This will take care
  of the first occurrence; then type ^L to proceed to the next occur-
  rence.

The second method lets you use other editing commands as desired between
replaces, yet initiate the next Replace with a single keystroke.

ACCELERATING GLOBAL REPLACE

Normally, Replace displays each substitution, even if the N option in con-
junction with the G option or a number (n) is in use. This screen updating
accounts for most of the Replace command's execution time. If you press any
key while such a command is executing (choose a harmless key, such as "cursor
up"), WordStar's normal suppression of screen updating when another key has
been entered will take effect, and the Replace will complete much faster.

STOPPING GLOBAL REPLACE

As just noted, a key pressed during a global Replace or a Replace with a
number (n) will suppress display of the ongoing changes while **accelerating**
execution. Thus, if you have such a command in progress and you notice it is
having an undesired effect on your document, use only the interrupt key (^U)
to stop it.

CAUTION WITH LARGE FILES

As detailed in Section 6, commands that move the cursor a long way backwards
should be used with caution in large files because of long processing time,
and since they can lead to a DISK FULL error because of the temporary file
space used. Instead, saving with ^KS is recommended to move the cursor to the
beginning of the file. This applies to the G option; in a large file, if the
cursor is not near the beginning of the file, execute a ^KS before starting a
global replace. Similarly, type ^KS before using the ^QV command in a large
file if the cursor is currently far beyond the starting point.

REPLACING TO END OF FILE

To replace all occurrences of a string from the present cursor position to the end of the file, respond to the OPTIONS question with a large number (n), such as 9999. All occurrences forward from the cursor will be changed, then a NOT FOUND error will occur. Using a large number (n) differs from using the G option in that the cursor is not moved to the beginning of the file first (as it is with the G option).

CANCELLING A COMMAND

To cancel an unwanted Find or Replace command, do one of the following:

- enter RETURN only for each question

- type ^U, the interrupt command

STOPPING A FIND OR REPLACE

To stop a Find or Replace in progress, type ^U, the interrupt character. An INTERRUPTED error will occur; the cursor will have been advanced to a random position. This is most useful after a typing error in the find string prevented finding something you thought was nearby, e.g., on the screen. With a long file, such an error will be indicated by the fact that instead of completing in a second or two, the command continues processing and DISK WAIT appears in the status line. Stopping the command before it searches to the end of the file reduces the time to get the cursor back to the starting point.

USING A SINGLE KEYSTROKE

To use a single keystroke for a commonly-used insertion, use the Replace command with a null (RETURN only) find string, then the desired string as the replace string, and the N option. This will insert the Replace string at the cursor position. Each time you press ^L, the string will be inserted again at the current cursor position.

FINDING AND DELETING A STRING

To find and **delete** a string, use the Replace command with a null replace string (RETURN only). This will advance the cursor to the next occurrence of the find string, and replace it with nothing (i.e., delete it). Press ^L to repeat.

CONVERTING A NON-DOCUMENT

To convert a file from a non-WordStar source so that its paragraphs can be reformed, you must change all carriage returns within each paragraph to spaces, then reform (they will all be "hard"). Position the cursor at the beginning of the first paragraph to be converted. Enter ^QA and (user entries are underlined):

　　　FIND? ^N   RETURN   REPLACE WITH   RETURN   OPTIONS? N   RETURN

Note that a space was entered for REPLACE WITH?. The above will change the first carriage return to a space, joining the first and second lines, and

leave the cursor at the beginning of what was the second line. Type ^L's until all carriage returns in the paragraph except the last one are removed. At this point, the paragraph is all one document line. Move the cursor to the beginning of the paragraph (no cursor motion is necessary if right margin is set to 1, since paragraph is now all one line), type ^B and then stand back! A marginated and justified paragraph, with the cursor at the end!

cursor down to the next paragraph (the cursor will already be in the correct place if there are no intervening blank lines) and repeat the process, using the single keystroke ^L to remove each undesired carriage return, ^B to form each paragraph and cursor down to pass those carriage returns you want to keep.

REPEATING A FIND OR REPLACE

To repeat a Find or Replace already typed, just press ^L.

USING THE PREVIOUS RESPONSE

Suppose you want to repeat the previous Find command, but with different options. Suppose the find string was long and tedious to type. Type ^QF, then respond to FIND? with a ^R. The previous find string will be displayed. Press RETURN to keep the old answer; OPTIONS? will then be asked as usual. Minor changes may be made in the answer by backspacing (with ^D, ^H, or BACKSPACE), retyping the desired characters, then using forward cursor (^D) or ^R to restore the rest of the string before pressing RETURN.

This method of resurrecting the old answer to the same question also works with the REPLACE? question, the OPTIONS? question, and other WordStar questions whose prompt ends in ?. Section 1 gives more description of question-response control characters.

Section 6
Other Editing Features

BLOCK OPERATIONS

The block move, block copy, and block delete commands give WordStar a powerful and easy-to-use "electronic cut and paste" ability. The commands used to carry out block operations are shown in Table 6-1.

Table 6-1. Block Commands

Command	Description
^KN	**Column Mode ON/OFF.** The setting for this toggle determines whether any blocks you mark are to be interpreted by WordStar as column blocks or ordinary margin-to-margin blocks.
^KB	**Mark Block Beginning.** Set block beginning marker <B> to cursor location, or hide marker if already set and displayed at cursor position.
^KK	**Mark Block End.** Set or hide block end marker <K>.
^KV	**Move Block.** Currently marked block of text is moved to the cursor position. Block markers move with text.
^KC	**Copy Block.** Currently marked block of text is copied at cursor position. Original text not changed; block markers move with copy.
^KY	**Delete Block.** Entire currently marked block of text is deleted from document.
^KW	**Write Block.** Asks for a file name, and writes currently marked block of text to that file. Text in document being edited is not changed.
^KH	**Hide Block.** Block marking is undisplayed if currently displayed, or displayed if currently hidden.
^QB	**Move to Block Beginning.** Cursor moves to block beginning marker; this marker is displayed if hidden.
^QK	**Move to Block End.** Cursor moves to block end (similar to ^QB).
^QV	**Move to Block Source.** Cursor moves to position of beginning marker before last block move, block copy, block delete, or block write. Use to inspect place text moved from. (The ^QV command has a different meaning if a Find or Replace has been executed since the last block operation (see Section 5).)

Note

Currently, you cannot use micro-justification with columnar-formatted material. For correct printing of text columns, enter .UJ OFF before the columns and .UJ ON following the columns. (See page 4-10, Section 8, and Section 3 for more information.)

Examples of Block Operations

Suppose you wish to move a paragraph of text to a different position in the document being edited. Proceed as follows: Place the cursor at the beginning of the paragraph to be moved. Type ^KB. This "marks" the beginning of the "block" to be moved; <B> will appear on the screen to indicate the position of the beginning marker. Move the cursor to the beginning of the **line after** the paragraph, and type ^KK to "mark" the end. On a terminal with highlighting, the marked block will now show dim or in inverse video; on other terminals, <K> will be displayed at the end marker position. Now move the cursor to the desired destination, and type ^KV. The marked paragraph, including the markers, will move to this position and appear on the screen.

As a second example, suppose you wish to move a sentence from within a paragraph to a different position. Proceed in a similar manner, marking the beginning (^KB) and end (^KK) at any desired positions, whether or not in the middle of lines. Then position the cursor at the desired destination, which may also be in the middle of a line (as between two sentences), and type ^KV to invoke the move. After moving the sentence, you will usually need to "reform" the source and destination paragraphs with the ^B command for margin realignment. Also, depending where you set the begin/end markers, there may be too many or too few spaces before or after the moved sentence, or where the sentence came from. This can easily be corrected with a few editing commands.

The block copy command, ^KC, is similar except the marked text is not deleted at the source; the block delete command, ^KY, deletes the entire marked block; and the block write command, ^KW, copies the marked text onto a **separate file** (more about this later in this section under "Additional File Commands"). Related commands include block hide/redisplay, which eliminates and restores the display of the block markers (or the highlighting of the entire block) from the screen, and ^QV, which, if issued after a block move or copy, moves the cursor to the place where the block came from.

For a quick summary of the basic block commands while editing, type ^K and wait for the menu to come up; type the help command ^JV to display a summary of the process of moving a block.

We will now describe the block commands in more detail. If this is your first reading of this manual, you may wish to skip to the next section, and come back here when you need a better understanding of the block commands. Since the block move, copy, delete, and write commands all operate on the current marked block of text, we will detail block marking first.

Marking a Block

A block is marked by placing the cursor at the desired beginning point and typing ^KB, and placing the cursor at the desired end point and typing ^KK. These commands work like the place marker commands (previous section): if the cursor is already at the indicated marker and the marker is displayed, it will be hidden (removed from the screen display).

The beginning and the end can be marked in either order, with any other intervening commands, and will remain in effect until reset whether used or not. For example, you can mark a block, then edit the text within the block. If the block is later block-copied, the copy will reflect all the changes.

The beginning and the end can be marked in either order, with any other intervening commands, and will remain in effect until reset whether used or not. For example, you can mark a block, then edit the text within the block. If the block is later block-copied, the copy will reflect all the changes.

The markers may be moved as desired. For example, if you execute another "mark end" (^KK) to correct the position of the end marker, it is not necessary to mark the beginning again.

To remember the block beginning and end commands, note that the word Block begins with a B and ends with a K.

ORDINARY TEXT BLOCKS

If the last line in the block you intend to mark is a complete line, we recommend placing the end marker at the beginning of the next line to include the carriage return at the end of the last line. The beginning and end markers may be set in mid-line to extract a sentence from the middle of a paragraph. All lines between the lines containing the markers are always included in their entirety.

COLUMN BLOCKS

If you are preparing for a column move, type ^KN before setting markers to set the system for column mode. Then type ^KB and ^KK as described above, except that you must place ^KK one space to the right of the end-point. The only difference will be how WordStar interprets these markers: they will define on the screen a rectangle whose upper left-hand corner is <B> and whose lower right-hand corner is <K>. On subsequent block operations, this rectangle will be what WordStar moves, copies, or deletes.

How the Marked Block Is Displayed

On terminals with highlighting (inverse video or high and low intensity) for which WordStar has been installed, the entire marked block is displayed highlighted, with no <B> or <K> shown. This makes it easy to see what text is marked. The spaces on the screen after the end of the last line in the block, and the flag character (< for hard carriage return) in the last line, are included in the highlighted area only if the end marker is after the carriage return at the end of that line.

A marked block will **not** appear highlighted in the following instances:

- the beginning marker is after the end marker, or at the same place

- only one of the markers is set and displayed

- the terminal has no highlighting capability,

On terminals without highlighting, for ordinary margin-to-margin blocks, the beginning marker will display as <B> and the end marker will display as <K>; for column blocks, the beginning marker will display as a column of <B>s and the end marker will display as a column of <K>s.

Unlike the place marker commands (which will operate on and display a hidden marker), block operations cause an error if the marked block is currently hidden. This protects your document against accidental block commands. If such an error occurs when you wanted the block operation to be performed, type ^KH and repeat the command.

Moving a Block

The block move command (^KV) moves all the text in the marked block to the cursor position, deleting the original at its old position. If no block is marked when the command is given, or if either marker is hidden, an error message occurs (Appendix B).

The destination may be in the middle of a line, if desired — for example when rearranging sentences in a paragraph. Just put the cursor where you want the block moved to. The cursor is left at the beginning of the moved text.

The beginning and end markers move with the block and remain displayed. After inspecting the result, type ^KH to hide the block markers -- both to remove the distraction from the screen, and to protect against block commands typed by accident. If you wish to use the same block markers later, just type ^KH again.

The block move command moves exactly the characters you have marked, and does no automatic reformatting. Thus, text reformatting is often required after a move. After rearranging sentences, for example, use paragraph reform (^B, Section 4) to re-establish the margins. You may also notice that you included too many or too few spaces or carriage returns at the beginning or end of the block. These errors are easily corrected with a few regular editing commands.

After a block move, the command ^QV will move the cursor to the place the block came from. It's a good idea to inspect here after moving, as you may have left too many spaces or carriage returns behind, or you may need to reform the paragraph. Note that any place markers 0-9 in the marked block do not move with it—they remain at the place the block came from.

For an example of moving a column block, see Figure 6-1.

A	BB	CCCC	DDDDDDDD		A	CCCC	BB	DDDDDDDD
A	BB	CCCC	DDDDDDDD		A	CCCC	BB	DDDDDDDD
A	BB	CCCC	DDDDDDDD		A	CCCC	BB	DDDDDDDD
A	BB	CCCC	DDDDDDDD		A	CCCC	BB	DDDDDDDD
A	BB	CCCC	DDDDDDDD		A	CCCC	BB	DDDDDDDD

Figure 6-1. Moving a Column Block

Copying a Block

The block copy command (^KC) is identical to the block move command except the text is not deleted at the source; a copy of it is made at the cursor position. The cursor is left at the beginning of the new copy of the text. Again, the block markers move with the text.

Several copies of a block of text may be made, one after the other, by typing
^KC several times in succession. Copies may be made in different places by
moving the cursor between copy commands. Each copy is made from the previous
one if you don't alter the markers; so make any desired copies of the text in
its current form before altering it.

For an example of copying a column block, see Figure 6-2.

A		BB		CCCC	▮DDDDDDDD	A	BB	CCCC		BB		DDDDDDD
A		BB		CCCC	DDDDDDDD	A	BB	CCCC		BB		DDDDDDD
A		BB		CCCC	DDDDDDDD	A	BB	CCCC		BB		DDDDDDD
A		BB		CCCC	DDDDDDDD	A	BB	CCCC		BB		DDDDDDD
A		BB		CCCC	DDDDDDDD	A	BB	CCCC		BB		DDDDDDD
A		BB		CCCC	DDDDDDDD	A	BB	CCCC		BB		DDDDDDD

Figure 6-2. Copying a Column Block

Deleting a Block

The block delete command (^KY) is a convenient way to remove a large quantity
of text from a file. It is also dangerous; the existence of this command is
one of the reasons why you should hide a marked block (^KH) when done with it.

Block delete leaves the beginning and end markers both hidden and set to the
position the text was deleted from. The cursor is not moved; however, the ^QV
command may be used after ^KY to move the cursor to the position of the
deletion.

For an example of deleting a column block, see Figure 6-3.

A		BB		CCCC	DDDDDDDD	A	CCCC	DDDDDDD
A		BB		CCCC	DDDDDDDD	A	CCCC	DDDDDDD
A		BB		CCCC	DDDDDDDD	A	CCCC	DDDDDDD
A		BB		CCCC	DDDDDDDD	A	CCCC	DDDDDDD
A		BB		CCCC	DDDDDDDD	A	CCCC	DDDDDDD
A		BB		CCCC	DDDDDDDD	A	CCCC	DDDDDDD

Figure 6-3. Deleting a Column Block

Writing a Block to a File

The block write command asks for a file name and writes the text in the marked
block to that file. This permits extracting a segment of text from one
document and saving it as though it were a different document. Uses of this
command include moving sections from file to file and moving blocks within
large files; block write and related commands are further discussed in the
"Additional Files Commands" later in this section.

Block write does not move the cursor, and does not alter the text in the document currently being edited. If a file with the specified name already exists, WordStar will ask

    FILE d:name.typ EXISTS -- OVERWRITE? (Y/N): ▮

If, in response to the above prompt, you type Y, WordStar will proceed with the block write, destroying any previous contents of the specified file. If you type N, WordStar will ask you again for the file name.

The Limit on Block Length

There is limit to the amount of text that can be block-moved, or block-copied at a time. The limit varies from about 500 characters if your computer has the minimum amount of RAM WordStar can run in, to many thousands of characters in a 56K or 64K system. If the block is too long, the command will result in a BLOCK TOO LONG error message. When this message occurs, repeat the operation with two or more commands each operating on half (or less) of the text.

Caution with Long Documents

Block move, block copy, block delete, and block write all involve moving the file cursor (internally—not visible on screen) to the location of the marked block, then back to the original position. If the cursor is a long way from the marked block, the command will execute very slowly and run the risk of a DISK FULL because of the work file space used (as discussed in "Long Documents" later in this section). For moving and copying text when the source and destination are far apart, it may be easier to use the block write command and the additional file read command (Section 6).

ADDITIONAL FILE COMMANDS

The commands described in this subsection relate to use of files other than the file being edited. Common applications of these commands include merging documents, extracting a section to form a separate document, assembling a document from previously prepared sections, and "cut and paste" within a document.

The files operated on by these commands and the files operated on by editing are interchangeable. You can extract a portion of one document with the block write command, then later edit the resulting file or you can merge a document previously entered by editing operations into another with the read additional file command, and so on. The commands are shown in Table 6-2, with discussions following.

Table 6-2. Additional File Commands

Command	Description
^KW	**Write Block.** Asks for the file name, and writes the marked block of text into that file (as described in the previous subsection). Document currently being edited is not altered.

Table 6-2. Additional File Commands (Continued)

Command	Description
^KR	**Read File.** Asks for file name, and inserts the entire contents of the indicated file into the current document **at the cursor position.** The file read may have been created with the block write command, or through the normal editing process--such files are interchangeable.
^KJ	**Delete File.** Asks for file name, then erases the file. Space occupied by file is made available for reuse. Equivalent to the operating system (CP/M) ERA command. Similar to the no-file menu Y command, Section 1.
^KL	**Change Logged Disk.** Changes disk drive for filenames entered without a drive name, and disk drive whose directory is displayed. Similar to the no-file menu L command.
^KF	**Directory ON/OFF.** Turns on and off display of the file directory during editing. Similar to the no-file menu F command.
^KP	**Print File.** Invokes printing of a document (See Section 8). Similar to the no-file menu P command.
^KO	**Copy File.** Makes a copy of a file in another file. Similar to the no-file menu O command.
^KE	**Rename File.** Changes the name of a specified file. Similar to the no-file menu E command.

Entering the File Name

Several of the commands in Table 6-2 ask for the name of the file to which the command is to be applied. Type in the desired file name and press RETURN. Control characters are available to correct typing errors in the answer or recall the previous answer to eliminate the need to retype; at help levels 2 and 3 the following reminder of the more commonly used control characters appears above the NAME OF FILE? question (see Section 1):

    ^S=delete character   ^Y=delete entry   ^F=File directory
    ^D=restore character   ^R=Restore entry ^U=cancel command

DIRECTORY DISPLAY (^F)

To view the file directory temporarily while entering a file name for an additional file command, type ^F at the NAME OF FILE? question. The names of the files on the logged disk drive will be displayed until RETURN is pressed; ^Z and ^W may be used as necessary to scroll the directory display up or down to permit viewing all file names. (To request a directory display that remains on the screen, rather than disappearing upon completion of the command, use the ^KF command).

REPEATING FILE NAME (^R)

To enter the same file name as used in the last additional file command given, just type ^R to the NAME OF FILE? question. The previous name will appear on the screen; préss RETURN to use it. This saves keystrokes and eliminates the need to remember the exact file name used, as from a block write command to subsequent read and delete commands for the same file. The NAME OF FILE? question of the block write, read additional file, and delete file commands differ from most questions in WordStar in that a single previous answer is stored for all three of them.

Common Uses of Additional File Commands

STANDARD TEXT (BOILER PLATE)

When you have standard paragraphs or sections that you frequently use, enter each into a separate file. Then use the ^KR command whenever desired to copy one of these paragraphs or sections from the separate file to the cursor position in a document you are editing. (Alternately, the MailMerge .FI dot command may be used to insert the boiler plate files while printing is being performed. The optional MailMerge command is described in Sections 9-12.)

After copying a "boiler plate" file into the document being edited, the Replace command (Section 5 above) may be used to assist in inserting names, addresses, or other information that changes with each use of the boiler plate. More flexible and powerful insertion facilities are provided by the optional MailMerge command, described in Sections 9-12.

MOVING TEXT FROM ONE DOCUMENT TO ANOTHER

Edit the first document, mark the desired text (put cursor at beginning of the text, type ^KB, put cursor at end, type ^KK), and execute a block write (^KW). Terminate editing of this document (abandoning with ^KQ is fastest if you have made no changes or deletions), open the second document, put the cursor where you want the text, and do a ^KR, specifying the file name used in the preceding ^KW.

ALTERNATE METHOD OF MOVING TEXT WITHIN A DOCUMENT

The block move and block copy commands were described earlier in this section; an alternate method of moving or copying text is to write the desired text onto an additional file (^KW command), move the cursor to the destination, and read the file (^KR command). This method is for moving text a great distance within a very long document, as it is faster and requires less temporary disk storage.

DELETING FILES

To conserve diskette space, delete any file you make temporary use of (as to hold text being moved between documents) as soon as you are done with it and have checked the results. This can be done with the ^KJ command.

If you do get a DISK FULL error (Appendix B), the ^KJ command may be used to delete any unnecessary files.

CHOICE OF FILE NAMES

When using the ^KW command, be sure not to choose an existing file name containing information you want to keep. To reduce the chance of overwriting existing text, some users like to use distinct file types. For example, DOC for documents, LIB for boiler plate files, and TMP for temporary files used only for moving text around within documents.

HELP COMMANDS

The following commands control the "help level" and display learning aids and reference information on the screen.

The "help level" (0 to 3) determines the degree of prompting and menu display used by WordStar. The various help levels were described in Sections 1 and 2 and are summarized on the screen when a "set help level" command (^JH) is entered.

Table 6-3. Help Commands

Command	Description
^JH	**Set Help Level.** Displays current "help level" and asks for new, as detailed in Section 1.
^JB	**Paragraph Re-Form.** Explains use of the ^B command.
^JF	**Flags.** Explains the meaning of flags in the rightmost column.
^JD	**Dot Commands.** Explains the ordinary dot commands (P command).
^JS	**Status Line.** Explains items on the status line.
^JR	**Ruler Line.** Explains the ruler line.
^JM	**Margins and Tabs.** Explains how to set margins and tabs.
^JP	**Place Markers.** Shows how to use place markers.
^JV	**Moving Text.** Shows how to move a block of text.
^P	**Print Control Characters.** Explains use of print control characters.
^O	Shows whether options such as word wrap and justification are on or off.

The ^J commands display information on the indicated subjects; many of these commands display more than one screenful, awaiting a keystroke between screens. To return to editing without proceeding through all the screens, type ^U.

The command prefix menus also show useful information in addition to commands that may be entered. The menus are described in Section 2.

MISCELLANEOUS COMMANDS

Table 6-4 describes commands not covered yet, and mentions a number of others
for reference.

Table 6-4. Miscellaneous Commands

Command	Description
^QQ	**Repeat.** The **next command entered** is repeatedly executed at a user-controllable rate. The screen is updated after each execution. While ^QQ is in effect, the digits 0-9 may be typed to vary the speed. 1 is fastest, 9 is slowest; 0 is even slower. The default speed is 3. Any other key terminates the repetition. For example, ^QQC displays successive screenfuls of text until stopped.
^U	**Interrupt.** Stops command(s) in progress. The slower commands interrupt in the middle of execution, leaving the cursor in an unspecified place.
^Px	**Enter Control Character.** Enters any next character x, except space, into the document, even if it is a control character normally interpreted as a command; if the next keystroke is a letter, the corresponding control character is entered. See Section 3.
^KL	**Change Logged Disk Drive.** Displays name of current logged disk drive, and asks for new logged disk drive. (To leave logged disk unchanged, press RETURN). Same function as no-file menu L command (Section 1).
^KF	**File Directory ON/OFF.** Enables/Disables ongoing display, during editing, of the file directory (names of all files) of the logged disk drive.
^KP	**Print a File.** The ^KP command first initiates printing. After printing has begun, a second ^KP **stops printing**; after a printing job has been stopped, a third ^KP **continues printing** again. The P entry in the ^K menu changes as appropriate. See Section 8 for details.

The Interrupt Command (^U)

If you have typed several commands, the interrupt command (^U) will clear
those whose execution has not yet started. Also, ^U may be entered in
response to questions such as FILE NAME? or FIND? to abort the command asking
the question. Unless nothing is interrupted, ^U displays

    *** INTERRUPTED ***

and requires the operator to press the ESCAPE key.

Changing the Logged Disk Drive (^KL)

Changing the logged disk drive does not effect which drive is used by edits
and prints already initiated. It does change the default drive for all file
names subsequently entered, as well as the drive whose directory is displayed.

The File Directory Toggle (^KF)

WordStar will usually display part of the directory only; ^Z and ^W may be
used to scroll the directory display in order to view all file names.

Note that ^KF causes the directory to become part of the screen display until
another ^KF is given. In contrast, ^F typed while entering a file name will
invoke a temporary directory display.

LONG DOCUMENTS

While WordStar can edit as large a file as can be held on a diskette, the
WordStar edit function works most quickly, easily, and flexibly on files of
moderate size. For best results, break up large documents into multiple files
whenever practical. However, there are several reasons why you may not wish
to divide your document into multiple files:

- A page break is mandatory between files.

- Automatic page-numbering works only within a file (though you can
  specify the starting page number of each file with a dot command).

- Multiple print commands must be given to print multiple files.

Determining File Size

The size of a file in bytes (characters) can be determined with the CP/M
operating system STAT command by entering the R command from the no-file menu.
You may also check file size, while editing, as follows: move the cursor to
the end of the file (^QC command) and enter ^OP to turn off page display.
When page display is off, the number of bytes (characters) in the file dis-
plays in the status line, in the form FC=ccccc.

How Large Is Large?

This varies over a wide range depending on the amount of RAM in your system.
When a file can be held entirely in RAM, as indicated by the fact that the
cursor will move from the **end** of the file to the beginning (^QR command) in a
couple of seconds, the file is still small. When this operation starts taking
minutes instead of seconds, the file is large. At this point you should
either read the rest of this section carefully, or divide the file in two (see
the block write command, ^KW, described earlier in this section, "Additional
File Commands").

Space for Large Files

When editing a file, WordStar always uses disk space to make the new copy, and also uses additional space for a temporary file whenever the cursor is moved **backwards** in the file from a point at which a change was made over more characters than can be held in RAM.

The first limit you will reach is having insufficient disk space for the **temporary file** used during cursor backup. When this limit is reached, a DISK FULL error (Appendix B) may occur on backwards cursor motion, but it will still be possible to move the cursor forward and to save. The impact of this limitation can be minimized by moving only forward when editing (below).

The second limit is that reached when there is insufficient diskette space for the **new copy of the file**. Don't let this occur! Watch your file size and diskette space available (with the operating system STAT command), and move files to separate diskettes as necessary to assure plenty of working space.

Eventually a file may get so large that it is not possible to fit two copies on a diskette. In this case, the file must be edited to a different diskette each time. As noted in Section 1, this is done by entering a space and a second drive name **after** the file name. You can do this with D or N in WordStar or in the system command that calls up WordStar. When you do this, each "save" will alternate between drives. Divide such large files into smaller files whenever you can. The absolute limit on file size is the capacity of a diskette.

Editing Technique for Large Files

Avoid moving the cursor a great distance backwards when you are editing a large file for two reasons:

- To minimize temporary work file disk space requirements and thereby avoiding DISK FULL errors;

- Moving the cursor a long way backwards is very slow.

To avoid moving the cursor a long way backwards, organize your changes to proceed forward through the file making all changes in approximate sequential order. To get back to the beginning from a place near the end, save (^KS) instead of using ^QR. Not only is saving faster for large files; saving also protects you against disasters by saving all changes made so far.

Similarly, if you want to do a global replace, save first to get to the beginning of the file. Also avoid using the block move and block copy commands if the source and destination locations are distant from each other. Instead, use block write (^KW) to a file, move the cursor (saving if cursor destination is before source), then use additional file read (^KR).

MORE ABOUT CHANGING DISKETTES

This section repeats the rules given in the **General Information Manual** about changing diskettes, and adds some exceptional conditions for changing diskettes safely.

1.   You may safely change the diskette in a drive when, at the system
      prompt (A>), you type ^C (control-C) <u>immediately</u> after the change.

2.   You may change diskettes when WordStar is at the no-file menu (not
      editing) and not printing to a disk file.

3.   If there has been no diskette in a drive since it was last safe to
      change diskettes, you may insert one in that drive.

4.   You may change the diskette in a drive if it is only to be read, as
      with the file read command ^KR (earlier in this section) or print
      (Section 8) commands. But be sure you issue no command that could
      write on the newly inserted diskette.

DOCUMENT FILES AND
FILE COMPATIBILITY

A WordStar document file (one edited with the D command, or in which word wrap
or ^B was used) may be incompatible with some other programs or languages.
This has no impact on word-processing applications in which all editing and
printing is done with WordStar, but if you wish to use WordStar as a general
purpose editor--to prepare input for other text formatters, to enter data for
application programs, or to edit program source files--read on.

The difference between a WordStar document file and a completely standard CP/M
file is that in the WordStar document file, the high order bit of a byte is
set in certain cases, whereas in the standard CP/M file, this bit is always
clear. Many programs and languages ignore this bit; in others, it causes
errors.

To generate a file that is sure to be compatible with other programs, invoke
edits with the "edit a non-document" (N) command (further described in the
next section), and don't use word wrap or the "reform paragraph" (^B) command.
Enter all carriage returns and format all lines as desired manually.

Alternately, use WordStar in any manner, then mask off high order bits by
copying the file using the [Z] option available in some versions of PIP, or by
editing the file with the CP/M EDitor or with MicroPro's WordMaster. This
will of course have the effects noted in the next paragraph; you may want to
keep an unmasked copy for later re-edit with WordStar.

WordStar document files should not be edited with other editors if you expect
to use the file later with WordStar. Doing so may change all soft spaces and
soft carriage returns into hard spaces and hard carriage returns, which will
frustrate any later attempts at reforming existing text with WordStar. Also,
if a file is thus edited, then printed with WordStar on a daisy-wheel printer,
micro-justification may not occur.

NON-DOCUMENT FILES

The word-processing user need not be concerned with this subsection.

Editing a Non-Document

The "Open a Non-Document" command (N on the no-file menu) has a dual purpose:
(1) to disable dynamic pagination for file compatibility, (2) to supply a dif-
ferent set of defaults for convenience.

We have occasionally noted differences between a regular file edit, initiated
with the D command from the no-file menu or with a system command of the form
"WS filename", and a "Non-document" edit initiated with the N command. Here
is a complete list:

   1.   Dynamic pagination, which makes use of the high order bit, is
        suppressed.   Page break display (^OP) cannot be turned on.

   2.   Status line shows file character and file line instead of page and
        line on page (Section 2).

   3.   Dot commands are not checked during editing:

        a.   No "?" flag for invalid dot command.

        b.   The message PUT AT FILE BEGINNING FOR CORRECT PAGE BREAK
             DISPLAY does not appear.

   4.   Word wrap, justification, variable tabbing, and ruler display default
        OFF rather than ON. These features may be turned on with the usual
        commands (Section 4) if desired.

Note that use of word wrap or paragraph reform (^B) can put "high order bit"
flags in the file, causing possible incompatibility with some external pro-
grams.

Fixed Tabbing Mode

For normal word processing uses, leave variable tabbing mode on. If you have
occasion to work with existing files containing tab characters, or wish to use
fixed tabs (for example, in computer program preparation), read this section.

When variable tabbing is off, "tab" characters (^I, 09 hex) are used in the
file, displayed with fixed stops every 8 columns, as opposed to the multiple
spaces entered into the file by variable tabbing mode. This type of tabbing
is compatible with that used by the CP/M editor and by MicroPro's WordMaster;
such tabs are customarily used in program development under CP/M.

Since each "tab" is a single character, fixed tabs edit differently from
variable tabs:

   •   The cursor cannot be placed within the white space on the screen
        representing the tab, but "pops" across it

   •   A tab deletes as a single character

   •   A single character will overtype a tab

When inserting before a tab, the text after the tab remains in the same screen position until sufficient text is inserted to push the tab to the next stop, at which point it "pops" right to the next multiple of 8 columns.

The tabbing mode relates to the **entry** of tabs (insertion (^V) on, or the line must be extended to reach the next tab stop). Tab characters already in the file will display the same (looking like spaces) and edit in the normal fixed-tab manner (not at all like spaces—previous paragraph) when variable tab mode is on. When variable tab mode is on and the tab key is used to move the cursor over existing text (insertion off), and the text contains tab characters, the cursor may come to rest beyond the next tab stop column since it can't stop in the middle of a tab character.

There is no need to set fixed tabbing to edit a file already containing fixed tabs unless you need to use the ^I (tab) key and have it enter fixed tab characters into the file. (Note that the version of PIP supplied with some systems has an option for expanding tab characters into multiple spaces with tab stops every n columns; you might wish to use this to convert a file from fixed to variable tabs.)

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Section 7
Printing Features: Part 1

Two types of print directives, _print controls_ and _dot commands,_ were intro-
duced in the **General Information Manual.** This section provides specific
details on print controls and some dot commands. Section 8 continues with
details on the rest of the dot commands and procedures for printing a docu-
ment.

PRINT CONTROL CHARACTERS

The _print controls_ are single control characters entered into the file during
editing to produce such special effects as underline, boldface, and sub-
scripts during printing.

Print controls are entered by typing ^P followed by the desired letter. The
letter may be typed in upper or lower case, or with the CTRL key pressed.
Features such as underlining and boldface, produced by print controls, may be
used freely in mid-paragraph (or even within a word); the control characters
fall through the word wrap and paragraph re-form operations with no special
consideration.

Formed lines containing print controls will appear to be too long on the
screen, but will be printed the correct length on paper. This is because
WordStar puts extra characters in the line to compensate for the fact that the
print controls use no columns during printing.

The print controls are shown in Tables 7-1 and 7-2, followed by detailed
discussions of certain topics. (When two characters are given under "Charac-
ter," the one on the left is the one you type after ^P; the one on the right
is the one displayed on the screen.) The Print Menu gives a quick summary of
these print controls.

Table 7-1. Print Control Toggles

Character		Function
^S	^S	**Underscore Toggle.** Enter before and after phrase to be underlined. Only non-blank characters are underlined; spaces and tabs between the two toggles are not underlined. Example: Screen: Just ^Sone^S word. Paper: Just <u>one</u> word.
^B	^B	**Boldface Toggle.** Offsets slightly and overstrikes on Daisy Wheel and other printers capable of incremental motion; multi-strikes each character on "Teletype-like" (i.e., regular) printers. Screen: Just ^Bone^B word. Paper: Just **one** word.
^D	^D	**Double-strike Toggle.** Strikes each character twice with no offset. Produces a lighter boldface than ^B; may also be used with carbon ribbon to produce extremely sharp impression of entire document. Screen: Just ^Done^D word. Paper: Just one word.

Table 7-1. Print Control Toggles (Continued)

Character	Function
^X ^X	**Strikeout Toggle.** Prints -'s over characters; may be used to indicate deleted text in a revised version of a document.
	Screen: Just ^Xone^X word. Paper: Just ~~one~~ word.
^V ^V	**Subscript Toggle.** Enclosed characters printed as a subscript, (i.e., printed a fractional line below the rest of the text).
	Screen: H^V2^V0 Paper: H_2O
^T ^T	**Superscript Toggle.** Enclosed text is printed fractional line above rest of text.
	Screen: (ab)^T2^T Paper: $(ab)^2$
^Y ^Y	**Ribbon Color Toggle.** For daisy wheel printers and other printers with ribbon color selection, causes enclosed text to be printed in alternate color, usually red.
	Screen: Just ^Yone^Y word. Paper: Just one word. [red]

Subscript Toggle (^V)

The amount of roll-down defaults to 3/48ths of an inch and may be altered with the subscript roll (.SR) command (later in this section). On printers without fractional line roll, a subscript is printed in the next line if it is blank (e.g., if double spacing); otherwise, it is printed in the same line.

Ribbon Color Toggle (^Y)

Of course, a two-color ribbon must be installed in the printer for ^Y to be effective. Special installation is required to activate this character on non-daisy printers (see the **Installation Manual**).

Table 7-2. Other Print Controls

Character	Function
^C	**Stop Print.** Stops printing until restarted by operator. May be used to permit typewheel or ribbon change, so that multiple typefaces or printing of different colors may be intermixed within document.
	Screen: Stop here.^C Paper: Stop here. [printer stops]

Table 7-2. Other Print Controls (Continued)

Character	Function
^A	**Select Alternate Character Pitch.** For daisy wheel printers, this goes to 12 characters per inch (elite), or as modified by the character width (.CW) dot command (later in this section). Normally ^A has no effect on non-daisy printers.
^N	**Return to Standard Character Pitch.** For daisy wheel printers, selects 1Ø characters per inch (pica), or as altered with .CW command (later in this section). Normally has no effect when printing on a non-daisy printer.
^K	**Left-Right Heading/Footing Control.** This character is used in heading and footing dot commands to produce headings, page numbers, etc. which print on the left side of even-numbered pages and on the right side of odd-numbered pages.
^F £	**"Phantom Space."** On a daisy wheel, print the character for code 2Ø hex. This code, normally a space for non-daisy printers, prints a "cent sign" or other special character on many 88- and 96-character daisy wheels—the exact graphic depends on the print wheel in use.
	Screen: This symbol (^F). Paper: This symbol (£). [example]
^G ¬	**"Phantom Rubout."** On a daisy wheel, print the character for code 7F hex. This code prints a NOT sign, double underline, or other graphic on many 96-character daisy print wheels.
	Screen: This symbol (^G). Paper: This symbol (¬). [example]
^O ^O	**Non-Break Space.** Prints as a space, but not treated as a space for line break or justification purposes during line forming.
	Screen: FORTRAN^OIV Paper: FORTRAN IV
^H ^H	**Strikeover.** Causes the next character to overprint the preceding character on the line.
	Screen: a^H` la mode Paper: à la mode
^Q ^W ^E ^R	**User Printer Functions.** These control characters are intended for accessing special printer functions that WordStar does not otherwise support, such as changing type fonts or activating a sheet feeder.

Stop Print (^C)

A stop print may be used in mid-line, or several times in the same line if desired. When the pause occurs, PRINT PAUSED will appear in the status line; the P command (no-file menu) or the ^KP command (while editing a file) may be used by the operator to restart the printer. Note that printers which normally print bidirectionally under WordStar will always print a line containing a ^C left to right.

Return to Standard Character Pitch (^N)

When installing WordStar for a "Teletype-like" (non-Daisy) printer, the user
may set up ^A and ^N to select between two character widths if the printer is
capable of changing character widths upon being sent a control sequence of
four or fewer characters. See the **Installation Manual**.

Left-Right Heading/Footing Control (^K)

When used on the same line as a heading or footing (.HE or .FO) dot command,
the effect of ^K is to suppress printing of following spaces up to the next
non-space if the page number is even. Outside of .HE and .FO commands, ^K is
ignored. See discussion of left-right page numbers in Section 8.

Non-Break Space (^O)

Use ^O where you want a single space to appear without allowing expansion
during justification or wrap to the next line.

Strikeover (^H)

Strikeovers are useful for putting accent marks over letters and for creating
special symbols by overprinting multiple characters. May be used in "formed"
text — word wrap and paragraph reform make proper allowances for backspaces.
Registration is not exactly precise in justified text. On a non-backspacing
(Teletype-like) printer, do not backspace through the same column more than 8
times.

User Printer Functions
(^Q, ^W, ^E, ^R)

When installing WordStar, each of these four controls may be set up to send
any desired sequence of one to four characters. Any line containing a user
printer function control is always printed forward even if bidirectional print
is in use.

Until a definition is installed, the four functions do nothing. Check Appen-
dix C of the **Installation Manual** to see if the standard WordStar installation
for your printer activates any of these characters. For information on in-
stalling your own definitions, see the **Installation Manual.**

Other Control Characters

Control characters not defined in Table 7-1 or Table 7-2 will print as a ^ and
a letter, just as they display, with the exception of the characters shown in
Table 7-3.

Table 7-3. Non-Printing Control Characters

Character	Function
^L	**Form Feed** causes a page break.
^I	The **tab** character displays and prints enough spaces to advance to the next tab stop. This character is not normally entered into a file by WordStar except in fixed tabbing mode (Section 6).
^M	**Carriage Return.** Entering a carriage return without a line feed (by pressing ^PM or ^P RETURN) will create an overprint line as described in Section 4.
^J	**Line Feed.** This character is not explicitly used in normal applications.

DOT COMMANDS

Dot commands are special non-text lines entered into the file for purposes such as setting the paper length or specifying a page heading. All dot commands have defaults suitable for normal use; you can begin using WordStar without using dot commands at all. Dot commands themselves do not print, but control the printing of actual text. Dynamic page break display also responds to certain of the dot commands.

The general form of dot commands was described in the **General Information Manual.** Briefly, a dot command consists of a period in column 1, a two-letter code, and, (for certain commands), a number, line of text, or other argument. Dot commands are entered into the file during editing in the same manner as other text, and display on the screen during editing. For convenience, automatic indentation to the left margin is disabled when a period is entered into or already present in column 1.

A dot command line placed anywhere in the file will be interpreted by the print function. Variables such as top and bottom margin and line height may be varied at will as far as printout is concerned. However, dynamic page break display will respond to the commands that specify line height, paper length, and top and bottom margins only when they are placed at the beginning of the file, before all text.

Tables 7-4 through 7-9, along with Tables 8-1 through 8-3, describe the regular print dot commands. These commands are summarized in Appendix A. For quick reference while editing, the ^JD command displays a brief summary of the dot commands.

The optional MailMerge command provides additional dot commands to control input of variable information from a data file or from the operator, insertion of other files into the printout, repeated printing of a file, etc. These additional dot commands are described in Sections 9-12. MailMerge also interprets all of the dot commands described here.

VERTICAL PAGE LAYOUT

The dot commands used for vertical page layout are shown in Table 7-4.

Table 7-4. Dot Commands for Vertical Page Layout

Command	Description
.LH n	**Line Height.** Sets line height to n/48ths of an inch on daisy wheel printers. Default: 8/48" = 1/6" (six lines per inch). (Lines in subsequent dot commands are assumed to have the height specified by .LH—either explicitly or by default.)
.PL l	**Paper Length.** The number of lines, including top and bottom margins on an entire page. Default: 66 lines.
.MT l	**Top Margin.** The number of lines from the top of the paper to the beginning of the body of the text on the page. Default: 3 lines.
.MB l	**Bottom Margin.** The number of lines at bottom of page not used for text. Default: 8 lines.
.HM l	**Heading Margin.** The number of blank lines from the page heading to the body of the text. (See also .HE command.) Default: 2 lines.
.FM l	**Footing Margin.** The number of lines between the end of the text and the page number or footing (see .FO). Default: 2 lines.

Discussion of Vertical Page Layout

The maximum number of lines on the page used for the body of the text is the paper length, minus the top and bottom margins. If the line height (.LH, above) is changed after these commands are given, the same number of inches, not lines, of text continues to be printed. Fewer lines are of course used for particular pages where .PA or .CP commands (below) cause page breaks. The top and bottom margin values may be adjusted to give the desired number of text lines on a page, and to center the text vertically on the page for your positioning of the paper in the printer.

During editing, the commands for line height, paper length, and top and bottom margin (.LH, .PL, .MT, and .MB) will be interpreted correctly by the page break display only if they appear at the beginning of the file. However, as far as printing is concerned, they may be used anywhere in the file to vary the vertical page format.

Note that the settings used for vertical page layout must be used in conjunction with the adjustment of page perforations in your printer. This adjustment can make a difference of two or three lines in how far up or down on the page the body of text appears (see Figure 7-1).

Line Height (.LH n)

As noted in Table 7-4, if no line height is explicitly specified in a file, the default is n=8, meaning a line height of 8/48" (1/6"), or 6 lines per inch. Table 7-5 shows how other specifications translate into lines per inch.
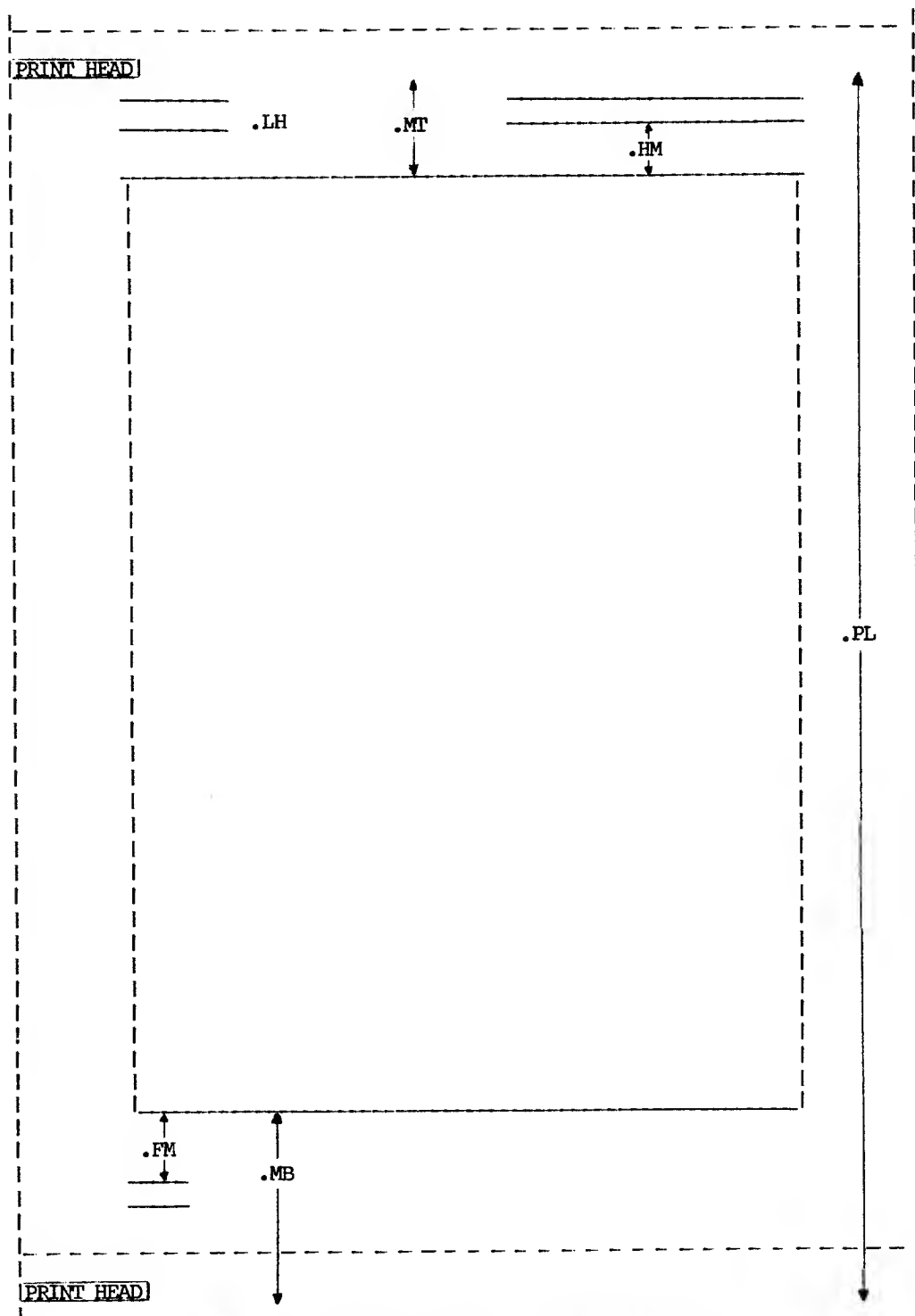
Figure 7-1. Vertical Layout of a Typical Page

Table 7-5. Line Heights

Dot Command	Lines per Inch	Dot Command	Lines per Inch	Dot Command	Lines per Inch
.LH 1	48.0	.LH 6	8.0	.LH 12	4.0
.LH 2	24.0	.LH 7	6.8	.LH 16	3.0
.LH 3	16.0	**.LH 8**	**6.0**	.LH 18	2.6
.LH 4	12.0	.LH 9	5.3	.LH 20	2.4
.LH 5	9.6	.LH 10	4.8	.LH 24	2.0

The .LH command provides an alternative or supplement to the single, double, triple spacing that can be applied via the ^OS command (Section 4) to text as lines are formed. If .LH is used when printing on a printer incapable of incremental spacing, page breaks are nevertheless determined as though the command took effect.

Note that all subsequent commands taking a number of lines as an argument will be interpreted in terms of the new line height. Previously set values (top margin, paper length, etc.) will remain the same in inches.

CHANGING LINE HEIGHT
ON A DAISY WHEEL PRINTER

On Daisy wheel printers, the line height may be specified in 48ths of an inch with the .LH command. For example, to print 8 lines per inch instead of the usual 6, use the command:

        .LH 6

When the line height is changed on a daisy wheel printer, **previously specified** margins and paper length are not effected. They remain the same in inches, regardless of the line size. However, subsequent .PL, .MT, .MB, .HM, and .FM commands are interpreted (converted to inches) in terms of the new line height.

Thus, if you use the .LH command, carefully consider the order in which .LH and other vertical format commands are given. For example, .LH 6 followed by .MT 4 yields a 1/2 inch top margin (4 lines of 6/48 each), whereas .MT 4 followed by .LH 6 yields a top margin of 2/3 inch, because the .MT command, appearing first, is interpreted using the default line height of 8/48 of an inch.

The print function will handle as many changes of line height as you wish, but for dynamic page break display to work, you must set the line height only at the beginning of the file.

Hint: To achieve varying line heights without interfering with dynamic pagination, set the line height to 4 (one-half of normal) at the beginning of the file, then use double-spaced text for close-spaced printout, and triple or quadruple spaced text for wider line spacing. The ^OS command, (Section 4), can be used to cause automatic double, triple, etc. spacing as text is entered or reformed.

CHANGING LINE HEIGHT
ON A NON-DAISY PRINTER

The line spacing on a non-daisy printer is unaffected, but the page breaks and
page length are determined as though on a daisy wheel printer. Thus, drafts
of text to be final-printed on a daisy wheel may be printed on a line printer
with page breaks occurring as they will in the final, but with the amount of
text being printed on a page frequently too little or too much for the forms
in use. Use the USE FORM FEEDS option (described in Section 8).

If you have a document containing .LH commands and you wish to to print it
neatly on a non-daisy printer, remove the .LH commands. Since ".." indicates
a comment, you can change them to ..LH with the Replace command. Then they can
easily be changed back to .LH later.

Paper Length (.PL 1)

The paper length must match the forms in use (except that smaller values will
also work if the USE FORM FEEDS option is selected when printing). The
default is 66 default-height lines, or 11 inches.

WordStar assumes 66 lines to the page, corresponding to 11-inch (letter size)
paper at 6 lines per inch. If you wish to use a different size of form (such
as legal size), specify the number of lines on each complete piece of paper
with the .PL command. This is not the number of lines of text printed, but
the form length. The paper length may be set shorter than the actual form
length only if your printer has hardware form feed capability and the USE FORM
FEEDS option is elected every time print is initiated (see Section 8).

A .PL command should also be used as appropriate if your non-daisy printer
prints lines spaced other than 6 to the inch. For example, if your printer
prints 8 lines to the inch and you want to use 11 inch paper, put .PL 88 at
the beginning of your file.

Top Margin (.MT 1)

Note that the page heading, if in use, and the heading margin, are printed in
this space. See also the commands for heading margin and heading text (.HM
and .HE). Default: 3 lines. The "top of the page" for the first page printed
is wherever you position the paper before starting print if the USE FORM FEEDS
option is not specified when print is initiated (see Section 8).

Bottom Margin (.MB 1)

The page number or footing, if in use, is printed within the bottom margin.
See the command for footing margin (.FM) below. Default: 8 lines.

TOP AND BOTTOM MARGINS

WordStar leaves a number of blank lines set by the top margin command (.MT) at
the top of each page (with the heading positioned in this space, if a heading
is in use), and a blank area (containing the page number, or the footing if
one has been specified) set by the bottom margin (.MB) command at the bottom
of each page. The number of lines of text printed on each page, if no page
break is caused by a .PA or .CP command, is equal to the paper length (.PL),

less the top and bottom margins. To increase the amount of text on a page,
decrease the top or bottom margin; to decrease the amount, increase margins.

POSITION OF TEXT ON THE PAGE

The text can be moved up or down on the page either by changing the top (.MT)
and bottom (.MB) margins by the same amount, or by moving the paper in the
printer, as preferred. The default top and bottom margins approximately
center the text vertically on the page if the paper is positioned with the
print head two or three lines down from the top of the page when printing is
initiated.

If you are loading single sheets, such as letterheads, you may want to move
the text up (smaller top margin) so that you can roll each sheet under the
bail.

Information on moving the text on the page horizontally is given in the next
subsection ("Horizontal Page Layout").

Heading Margin (.HM 1)

Note that the heading and the heading margin fall within the top margin space.
If a value greater than top margin less 1 is specified, top margin less 1 is
used. Default: 2 lines.

Footing Margin (.FM 1)

Note that the footing margin and the page number or footing appear within the
bottom margin space. Default: 2 lines.

HORIZONTAL PAGE LAYOUT

Most horizontal formatting, such as the margination and justification of text,
is done during editing, and does not involve dot commands. The dot commands
shown in Table 7-6 are provided to control those aspects of horizontal format-
ting that are done by the print function.

Table 7-6. Dot Commands for Horizontal Page Layout

Command	Description
.PC c	**Page Number Column.** Column at which the page number is printed when footing is not in use and page-numbering is in effect. Default: center column. (See Table 8-1 for the commands relating to footings and page-numbering.)
.PO c	**Page Offset.** Number of (current width) columns the entire document is indented (moved right) from the printer's left margin, in addi- tion to all indentation in the file. Default: 8 columns.

Page Number Column (.PC c)

The page number column may be set to print page numbers at left, right, or
center, etc., at the bottom of the page. (Additional page number positioning
options are provided through the use of # in .HE and .FO commands, as

described in Tables 8-1 and 8-2.)   The column width used is that of the
character width in effect when the .PC command is given, as determined by ^A,
^N, or .CW commands.   Default is 1/2 the edit function's default right
margin, to center numbers under text of default width.

Page Offset (.PO c)

The page offset command allows offsetting the text from the tractor-feed holes
at the left of the paper, and allows putting narrow paper near the center of
wide printer carriages. Default: 8 columns.

The text can be moved horizontally on the page by changing the page offset.
By default, WordStar prints 8 spaces (in addition to any in the file) at the
beginning of each line; to move the text to the left edge of your printer
carriage, put the following at the beginning of the document:

    .PO 0

PAGINATION

The dot commands used for pagination are shown in Table 7-7.

Table 7-7. Dot Commands for Pagination

Command	Description
.PA	**Unconditional Page.** Start new page unconditionally.
.CP 1	**Conditional Page.** Start new page if there are fewer than 1 lines (of the current height) left on the current page.

Page break control is used for two purposes:

  o   to force the following text to begin at the top of a page, as at the
        beginning of a chapter;

  o   to prevent going to a new page in an inappropriate place (such as in
        the middle of a table or after a section title but before the
        beginning of the text after the title). Many users also wish to
        prevent page breaks one or two lines into a paragraph, preferring
        that the entire paragraph be on the next page.

Unconditional Page (.PA)

For the first case, where a new page is always desired, use the unconditional
page command:

    .PA

Conditional Page (.CP 1)

For the second case, it is usually desired to have a page break occur only
when less than a certain number of lines remain on the current page. For
these cases, use the conditional page (.CP) command. This command tests the
number of lines remaining on the current page, and causes a page break only if
too few remain. For example, if you have a table 10 lines long, put

    .CP 10

above it. This will cause a page break during printout (and also display the
page break line on the screen unless the page break display is OFF) only if
less than 10 lines remain on the current page. That is, the following 10
lines, containing your table, will print on the current page if they will fit,
otherwise a new page will be begun, with your table at the top.

Using .CP instead of .PA reduces the need to check pagination and move dot
commands as the document is updated. For example, if a page break fell in the
middle of the table of the previous example and you corrected this by inser-
ting a .PA above it, you would need to find and remove the .PA later if you
made an insertion above the table as .PA always causes a page break even if it
falls at the top of a page. On the other hand, a .CP 10 that falls more than
10 lines above the bottom of a page has no effect and may be left in the
document, to become active whenever revisions preceding it make it fall near
the bottom of the page.

As another example, we suggest always putting .CP 5 (or so) above each section
title. This forces a new page if less than 5 (or whatever number you specify)
lines remain on the page, so that a section title will not appear as the last
line on a page or with only two or three lines of text after it. If you enter
these as a matter of habit when initially entering documents, then as the
document is revised it will always print well-paginated even if you do not
review the pagination after each edit.

One more example: look at this manual. It rarely pages in mid-paragraph.
This was accomplished via generous use of .CP commands.

Use .CP to keep blocks of text together, to prevent paging just after a title,
in the middle of a table, etc. Using lots of .CP commands can make the doc-
ument always print well paginated regardless of insertions or deletions as
these commands have no effect when not needed.

Section 8
Printing Features: Part 2

HEADINGS, FOOTINGS,
AND PAGE NUMBERS

The dot commands for headings, footings, and page numbers are shown in Table
8-1.

Table 8-1. Dot Commands for Headings, Footings, and Page Numbers

Command	Description
.HE text	**Heading.** All text on the rest of the line beginning with .HE is used as a page heading for FOLLOWING pages until another .HE is given. Default: no heading. (See Table 8-2.)
.FO text	**Footing.** The rest of the line beginning with .FO is used as a page footing for the current and following pages. Default: page number. (See Table 8-2.)
.OP	**Omit Page Numbers.** This command suppresses the printing of page numbers in the footing line if no footing has been given.
.PN	**Page Number.** .PN without a number turns page numbering back on after a .OP command without setting page number.
.PN p	**Page Number.** .PN with a number turns page numbering on (if it has been turned off with .OP) and sets the page number.

The special characters shown in Table 8-2 are interpreted in headings (.HE)
and footings (.FO) only.

Table 8-2. Special Characters Used in Headings and Footings

Character	Description
#	Prints as current page number. May be used to position page number wherever desired at top or bottom of page.
\	Print next character literally; do not interpret it as a contol symbol-- use \# to print # in a heading or footing, \\ to print \.
^K	If the page number is **even,** ignore spaces up to the next character ^K may be used to cause page number or other heading or footing text to appear on the corner of the page away from the binding.

Note that a control-K is entered into the file by typing control-PK, as with
all print controls ("Print Control Characters" in the preceding section).

Heading (.HE text)

The heading may be changed as often as desired. The initial (default) heading is blank; the heading may be changed back to blank with .HE with no text. To print a heading on the first page, a .HE command must precede all text in the file.

When composing a heading (or footing) on the screen, bear in mind that the characters ".HE " are never printed. Thus, the heading will appear in the printed document four columns to the left of where it appears on the screen.

Underline, boldface, and other enhancements invoked by print control characters may be used freely in headings (and footings) without affecting the body of the text; conversely, enhancements in use in the body of the text do not affect headings and footings.

Use the .HE command to specify the text of a one-line heading to be printed at the top of each page.   Examples:

    .HE Part II

    .HE Section 3   Basic Editing

When composing a .HE command on the screen, bear in mind that the ".HE " takes four columns that don't print, so it will display four characters to the left of where it will print. Spaces in addition to one after ".HE" are printed, so a right-adjusted heading may be produced, for example, as follows:

    .HE   Section 5

PAGE NUMBER IN THE HEADING

If you wish the page number to be printed at the top of the page, give a .HE command with a "#" in the position where you wish the page number printed. For example, if you want the word "page" followed by the page number at the top left of each page, use the following dot command:

    .HE page #

When composing a heading containing a #, bear in mind that the number of columns occupied by the page number will depend on the number of digits in the page number. When printing the page number at the top of the page but not using a footing (no .FO command), it is necessary to give a .OP command to prevent WordStar from printing the page number again at the bottom of the page.

CHANGING THE HEADING

The heading may be changed as often as desired; to revert to no heading, give a blank heading:

    .HE

Each .HE takes effect at the **next** page top encountered; if it occurs before
any text has been printed on the current page (for example, immediately after
a .PA command), it will be used on the current page.

The number of lines between the heading and text can be changed with the .HM
(heading margin) command.   This command moves the heading, without altering
the page length or the position of the text on the page; the heading margin
falls within the top margin.   No heading will be printed if the top margin
(.MT) is set to zero.

SPECIAL EFFECTS IN THE HEADING

Underline, Boldface, and other enhancements invoked by print control charac-
ters may be used freely in headings (and footings). Print controls in .HE
(and .FO) commands do not affect the body of the text, nor do those in the
body of the text effect the heading (or footing). If you vary the character
width (as discussed below), the heading (or footing) will be printed in the
character width that was in effect when the .HE (.FO) command was given.
However, if ^A or ^N is used within the heading (or footing), the pitch in
effect at each time the heading is printed will be used.

Footing (.FO text)

As many .FO's as desired may be given; the footing most recently specified
will be used when the bottom of each page is encountered.   The characters #,
\, and ^K are interpreted in the footing text as described for the .HE command
above.

When no .FO command, or .FO with no text after it, has been given, WordStar
will print the page number in the footing line at the column specified with
the .PC command (default center unless suppressed with the .OP command).   When
a user-specified footing is in effect, page numbers are **not** automatically
printed. If you wish the pages to be numbered, include a # at the desired
position in the heading or footing.

The .FO command may be used to specify a line of text to be printed at the
bottom of each page. Use of this command is similar to use of the .HE command
(preceding).   The most recently specified footing is used when the bottom of
each page is encountered.   If the footing contains a #, the page number will
be printed in place of the #.

The .FM (footing margin) command may be used to specify the number of blank
lines between the bottom of the text area and the footing line.   The footing
margin lies within the bottom margin; varying the footing margin moves the
footing up and down without changing the number of lines of text on the page.
No footing will be printed if the bottom margin (.MB) is set to zero.

THE DEFAULT FOOTING
IS THE PAGE NUMBER

If no footing is in effect (no .FO comand given, or most recent .FO command
had no text after ".FO"), WordStar will print the page number in the footing
line unless suppressed with a .OP command. The page number is centered at the
column specified with the .PC command; the default is column 33 (or column 30
if a 64-column wide screen is used, reflecting the narrower default margins
used in the edit function), so as to be centered under text formed using the
default margins.

PAGE-NUMBERING

By default, WordStar numbers the pages in each file from 1 up as the file is printed. The page number may be changed as desired with the .PN command. For example, if a file represented the second chapter of a large document, and there were 23 pages in the first chapter, you might want to put

.PN 24

at the beginning of the chapter 2 file, so that its pages would be numbered from 24 up as it was printed. Note that .PN effects the page numbering at printout only; the page numbers displayed in the status line during editing always start with 1 and increase by 1 each page.

The maximum page number WordStar will accept is 65533. (For the other dot commands, the maximum argument is 255.)

The page number may be positioned wherever desired in the heading or footing line by using a # in the .HE or .FO command, as discussed above. If no footing is specified, the page number is printed by default in the footing line. This default page number printout may be disabled with .OP, and re-enabled with .PN (no number need be given after .PN unless it is also desired to set the page number). The column at which the page number prints in the default footing may be changed with .PC n. For example, if you wanted to center the page number under text 80 columns wide (as formatted during editing) you could use

.PC 40

The following footing command would have the same effect:

.FO   #

ALTERNATING PAGE NUMBERS

By using the special character ^K in a .HE or .FO command, you can make WordStar print page numbers (or other heading and/or footing texts) at the right hand side of odd numbered pages but at the left hand side of even numbered pages, so as to be on the side of the page farthest from the binding. The effect of ^K is to suppress printing of following spaces (up to the next non-space character) if the page number is even. For example, the following footing is used in this section of this manual:

.FO ^K   8-#

The above footing prints on even-numbered pages as

8-#

putting "8-" and the page number on the lower left corner of the page. On odd numbered pages, it prints as

                                                                         8-#

Omit Page Numbers (.OP)

If a footing has been specified, .OP has no effect; .OP also does not affect printing of page numbers where a # appears in the heading or footing. Page numbering defaults on.

Page Number (.PN or .PN p)

A page number command **without** a page number (.PN) has no effect if the footing line has been preempted with a .FO command.

A page number command **with** a page number (.PN p) sets the page number to appear at the bottom of the current page and/or at a # encountered as the page heading or footing is printed. The default starting page number is 1; the page number increases by 1 each page whether or not printed. .PN effects the printout page number only; those displayed at the top of the screen during editing always run up from 1.

OTHER FEATURES

Dot commands for other printing features are shown in Table 8-3.

Table 8-3. Dot Commands for Other Features

Command	Description
.CW w	**Character Width.** On daisy wheel printers, sets character width to w/120ths of an inch, for either the standard or alternate character pitch, whichever is in effect. Default: 12/120" = 1/10" (10 characters per inch).
.SR n	**Sub/Super-Script Roll.** On daisy wheel printers, rolls the carriage n/48ths of an inch before printing a subscript or superscript. Default: 3/48".
.UJ ON .UJ OFF	**Microjustification ON/OFF.** When Microjustification is OFF, all spaces, including soft spaces, are printed exactly as they appear in the file. Spaces added to justify lines on the screen print as they appear on the screen, rather than being evenly distributed between words in 1/120ths of an inch on daisy printers. Default: ON.
.BP ON .BP OFF	**Bidirectional Print ON/OFF.** Bidirectional print (printing alternate lines right to left) is normally ON for daisy printers.
.. text	**Ignore.** This command specifies that the rest of the line is commentary material not to be printed.

Character Width (.CW w)

Standard and alternate pitch are selected by the ^N and ^A print controls. Has no effect on non-daisy printers. Allows unusual character spacings--for example, spacing characters farther apart than normal for emphasis in a title. The default standard pitch is 10 to the inch (equivalent to .CW 12); the default alternate pitch is 12 to the inch (.CW 10). Table 8-4 shows the .CW

command to use for various pitches (characters per inch). It also shows where to set the right margin when printing at a given pitch on standard paper (8-1/2" x 11").

Table 8-4. Character Pitch

Dot Command	Pitch (Ch/Inch)	Right Margin	Dot Command	Pitch (Ch/Inch)	Right Margin
.CW 4	30	198	.CW 12	10	66
.CW 5	24	158	.CW 15	8	53
.CW 6	20	132	.CW 17	7	47
.CW 8	15	99	.CW 20	6	40
.CW 10	12	79	.CW 24	5	33

Changing the character width or pitch (with .CW, ^A, or ^N) does not affect previously specified page offset (.PO) or page number column (.PC) values, nor previously specified heading (.HE) or footing (.FO) texts (except when ^A or ^N are used within the actual heading or footing texts). Subsequent page offset, page number column, heading, and footing commands (.PO, .PC, .HE, and .FO) will be interpreted in terms of the character width and pitch in effect when the .PO, .PC, .HE, or .FO is encountered.

CHANGING THE CHARACTER PITCH

The width of each character printed (how far the print head moves between characters) can be varied in two ways: with the ^A and ^N print control characters (earlier in this section), which may be imbedded mid-line to allow switching between two character widths, and (on a Daisy wheel printer) with the .CW command, which allows setting any character width, but only between lines. These can interact, as will be described shortly.

When a page offset (.PO), page number column (.PC), heading (.HE), or footing (.FO) is specified, it is interpreted in the current character pitch; subsequent pitch changes do not alter the page offset, page number position, or the character spacing in previously specified page headings or footings.

CHANGING PITCH ON A NON-DAISY PRINTER

To change pitch on a non-daisy printer, use the Alternate pitch (^A) and standard pitch (^N) print control characters. Their effect depends on your printer's capabilities and on what control sequences are installed in WordStar for these characters. There will be no effect if no control sequences are installed or your printer has one pitch only.

CHANGING PITCH ON A DAISY WHEEL PRINTER

To change pitch on a daisy wheel printer, use the ^A and ^N print controls or the .CW command or a combination of all three:

^A   Selects alternate pitch, which defaults to 12 characters per inch and may be changed by giving a .CW when alternate pitch is in effect;

^N   Selects standard pitch, which defaults to 10 characters per inch and may be changed by giving a .CW when standard pitch is in effect;

.CW n   Sets the character width to n/120ths of an inch for standard or
         alternate pitch, whichever is in effect, without affecting the other
         pitch.   Table 8-4 gives the .CW command to use for various numbers
         of characters per inch.

EXAMPLES OF DAISY WHEEL PITCH CHANGES

        ^NThe word "^Acrammed"^N is printed in alternate pitch

will print with the word "crammed" in 12 pitch and the rest in 10 pitch if no
preceding .CW commands have altered the pitches.

     ^A
     .CW 20
     ^N
     .CW 8
     narrow^C^A w i d e ^C^Nnarrow

will print "narrow" in characters 8/120 inch wide (15 characters per
inch),then "wide" in characters 20/120 inch wide (6 characters per inch), then
"narrow" in 8/120 wide characters again.   The ^C's (Section 7) cause the
printer to pause so that the operator may install a different typewheel for
wide characters. The carriage returns after the ^A and the ^N will cause two
blank lines to be printed first.

Microjustification (.UJ ON/OFF)

Microjustification is normally on.   Turning microjustification off might be
useful, for example, to make a columnar table print with the columns aligned
as they appear on the screen even if soft spaces were inadvertently allowed to
get into the table lines by re-forming (^B) or word wrap.   You may also
use .uj 1 (for ON) and .uj 0 (for OFF).

Bidirectional Print (.BP ON/OFF)

Turning bidirectional print off might in some cases produce better quality
output when the printer's character registration or paper feed is a little
sloppy.   You may also use .bp 1 (ON) and .bp 0 (OFF).

Comment (.. text)

Any undefined dot command is also treated as a comment by the print function;
however, the edit function displays a ? flag in the rightmost screen column
for undefined dot commands.   (You may also use **.ig text**)

PROCEDURES FOR PRINTING

The print function prints a document or other file from a diskette. Unless
suppressed by an option described below, the top margin, bottom margin, page
heading, and page footing are added to the text in the file, and dot commands
are interpreted.   The print control characters are always interpreted during
printout to control underline, boldface, pauses for typewheel changes, charac-
ter pitch, etc.

Microspace Justification

If the printer in use is a daisy wheel printer (Diablo or Qume), thimble
printer (NEC) or other printer capable of incremental spacing, and WordStar is
properly installed to use this printer (**Installation Manual**), the printed copy
will be **microspace justified**: WordStar will remove the "soft" spaces used to
justify formed lines on the screen, and add space in units of 1/120th inch
between words, and possibly between characters, to produce an evenly spaced
line without large gaps between words. To further enhance the appearance of
printed text, punctuation characters such as periods and commas are printed in
a space narrower than other characters, and M's and W's are widened slightly.

Microspace justification is applied only to the area between the left and
right margin of lines "formed" with word wrap or paragraph reform, so that
margin alignment and position of any text outside the margins is maintained.
Lines not "formed" with word wrap or paragraph reform are not microspace-
justified, so that the alignment of columns in tables is precisely reproduced
(the last line of a newly-entered paragraph must be "formed" with paragraph
reform in order to be microspace-justified on printout).

Only a disk-stored document can be printed by WordStar; refer to the **General
Information Manual** for document saving commands.

Simultaneous Editing

Since the print function can operate at the same time as the edit function, it
does not have its own menus, but is invoked, stopped, and resumed with the P
command of the no-file menu, or the ^KP command while editing. When the print
function is inactive, these commands will invoke initiation of printing. When
printing is in progress, the same commands will stop printing. If printing is
suspended ("paused"), the P or ^KP command will cause printing to resume. The
menus change appropriately to indicate the current meaning of the command.

When printing is in progress, the no-file menu or the file being edited shows
on the screen in the normal manner.

Editing can be initiated or continued, and most other no-file commands can be
executed, while the (regular) print function is active, except on computers
with minimal RAM memory. Keyboard response is somewhat slowed during prin-
ting; concurrent editing and printing are suggested for review and minor
correction, but not for high-speed initial entry of text. When editing while
the print function is active, watch for DISK WAIT in the status line, or
listen for clicks from your disk drive, and stop entering text until the disk
activity completes. You may suspend printing (as described later in this
section) temporarily when faster keyboard response is desired.

Error Handling

There are no error messages during regular print execution. Contradictory
page formats, such as the heading margin greater than the top margin minus 1,
force WordStar to make arbitrary decisions to allow printing to continue.
Control characters with no special definition are printed as ^ and a letter.
Unrecognized dot commands are ignored (**not** printed). The additional dot
commands interpreted by the optional MailMerge command (Sections 9-12) are
also ignored by the regular print command. (The MailMerge command displays a
message upon encountering an unrecognized dot command; MailMerge may thus be

used for checking the dot commands in a document even when its other facilities are not needed.)

Printing Other Files

While the print function is intended primarily for printing documents prepared with WordStar, you may print any ASCII disk file. Form feeds work as page indicators, and tab (^I) characters expand to 8-column stops, ensuring compatibility with languages and other programs that output print files to diskette. An option is available for suppressing page formatting to permit printing a direct image of an (already-paginated) file.

Printing to Disk

Print function output can be directed to disk as well as to the printer, so that a print image can be saved for later output or for examination on the screen with the edit function. In a disk output file thus produced, all dot commands present have been interpreted (unless suppression of page formatting was specified) but most print control characters remain. If no WordStar print control characters were used, the disk print output file may be printed without using WordStar.

Printer Setup

You will want to position the paper in your printer so that the text comes out in the desired vertical and horizontal position. A few trials may be needed to establish the desired paper position. The position of the text on the page can also be manipulated via the .PO, .MT, and .MB dot commands (section 7) as well as by moving the paper in the printer. The print function assumes the paper to be at the "top of form" position when printing is initiated, unless the USE FORM FEEDS option (below) is specified.

The Optional MailMerge Feature

MailMerge provides additional print-time facilities for insertion of variable information from a data file or operator entry into form letters, insertion of other document files into the printout, print-time line-forming, etc. This section describes the regular print command; the MailMerge command differs in that one additional question (NUMBER OF COPIES?) is asked during the initiation dialog, and in that editing cannot be performed at the same time as printing. MailMerge operation is detailed in Sections 9-12.

Initiating Printing

When a print command (P or M from the no-file menu, or ^KP while editing) is given with no print in progress and no print suspended, the command means "Initiate print". WordStar will ask:

NAME OF FILE TO PRINT? █

Enter the file name. (File names are discussed in the **General Information Manual.** They are also summarized in a prompt that appears on the screen whenever you use the "open a document" command, D from the no-file menu.) The usual control characters (Section 6) may be used to correct typing errors and invoke file directory display. For details on initiating MailMerge, see Section 12.

To start printing immediately with all options defaulted; make sure the prin-
ter is ready and the paper properly positioned, and press the **ESCAPE** key after
typing the file name. To cause WordStar to ask the print options questions
before beginning to print, press the **RETURN** key after typing the file name.
If the file is not found, a message will be displayed and the question re-
asked.

When the name of the file to print is terminated with the **RETURN** key, WordStar
will ask the following **Print Options Questions** before starting to print:

>   DISK FILE OUTPUT (Y/N):
>   START AT PAGE NUMBER (RETURN for beginning)?
>   STOP AFTER PAGE NUMBER (RETURN for end)?
>   USE FORM FEEDS (Y/N):
>   SUPPRESS PAGE FORMATTING (Y/N):
>   PAUSE FOR PAPER CHANGE BETWEEN PAGES (Y/N):
>   Ready printer, press RETURN:

All of the Y/N questions are answered with a single character: Y or y or ^Y
for "yes", any other character for "no"; either the **RETURN** or **ESCAPE** keys can
be used to give a "no" or other default response to any of the options ques-
tions. Seven **RETURN**s thus produces the same effect as hitting the escape key
after the name of the file to print. Initially, you will probably want to
default most or all of the questions. The print command can be aborted by
typing ^U at any of the print options questions.

Explanations of each of the print options questions follow.

DISK FILE OUTPUT (Y/N): ▮

A "no" response (any single character except Y or y or ^Y) will cause the
print output to go to the printer, as normally desired.

A response of Y or y or ^Y causes WordStar to ask "OUTPUT FILE NAME?".
The "printed" output will then be placed on this file; this file will
differ from the input in that it will be a print image, with all dot
commands expanded (unless a "yes" answer is given to **SUPPRESS PAGE FOR-
MATTING**) suitable for later copying to the printer or for examination on
the screen with the edit function.

START AT PAGE NUMBER (RETURN for beginning)? ▮

Type a number followed by a carriage return or escape in order to start
the print at that page number. This allows restarting after printer
paper jams, or printing only some latter part of a document.

A null, 0, or 1 response causes printing to begin at the beginning of
the file. A non-numeric, non-null response will cause the question to be
reasked until an acceptable answer is given.

STOP AFTER PAGE NUMBER (RETURN for end)? ▮

Type a number and press either RETURN or ESCAPE to stop the print opera-
tion after completion of the given page number. This step provides you
with a way to print only the desired pages of a document without having
to manually interrupt the print operation. A null response will cause
the printing to continue until the end of the file is encountered.

USE FORM FEEDS (Y/N): ▌

Normally, WordStar sends the correct number of line feeds to the printer to advance to the top of the next page. Answering Y to this question causes WordStar to send a "form feed" character (0C hex) instead of multiple line feeds between pages, and also before the first page (most printers ignore form feeds when already at top of form.) Of course, the printer must be equipped to respond to form feeds, and the paper must be loaded into the printer with the top of form in the desired position.

Using form feeds is faster with some non-daisy printers, and eliminates the need for the paper length set with the .PL command to exactly match the forms and the need to vertically position the paper manually before initiating print.

SUPPRESS PAGE FORMATTING (Y/N): ▌

A "Y" response to this question causes WordStar to print the dot commands in the file, rather than interpreting them. The page formatting normally done under control of the explicit or default dot commands is not done -- no top margins, bottom margins, page offsets, headings, footings, or page numbers are added to the text in the file. The output will print across the folds in the paper if not already paginated. Most print control characters in the file are interpreted regardless of the answer to this question.

Use of the SUPPRESS PAGE FORMATTING option yields a printout of the exact contents of the file, rather than a formatted document, allowing you to proofread the dot commands. This option is also appropriate for printing already-paginated files not created by WordStar, and for printing disk files created with the print function DISK FILE OUTPUT option.

PAUSE FOR PAPER CHANGE BETWEEN PAGES (Y/N): ▌

To print on single sheets individually loaded into the printer, such as letterheads, give a "yes" response (Y or y or ^Y) to this question. WordStar then pauses after printing each page. When such a pause occurs, PRINT PAUSED appears in the status line. After changing the paper, type a P (no file) or ^KP (while editing a file) to continue printing.

A "no" response (any character but Y, y, or ^Y) causes WordStar to print continuously. This assumes you are printing on continuous forms.

Ready printer, press RETURN: ▌

Make sure your printer is ready - turned on, set "on-line", whatever your equipment requires. Unless the USE FORM FEEDS option was specified, make sure the paper is positioned where you wish the top of the first page to print. If the paper is positioned part way down a page, each successive printed page will begin at this position.

Then press any key. Printout will begin, and control will return to the no-file menu or to the edit function.

Suspending and Aborting Printing

A print command (P if no file, ^KP while editing) given while printing is in
progress will cause WordStar to stop printing, display a message showing the
name of the file being printed, and ask the following question:

TYPE "Y" to ABANDON PRINT, "N" TO RESUME, ^U TO HOLD: ∎

- "Y" causes the print in progress to be aborted.

- "N" causes printing to continue. You may resume printout after
  stopping to adjust the paper in the printer, etc.

- An interrupt character (^U) causes control to return to the no-file
  menu or to the edit function with the print suspended ("paused") but
  not aborted. The next print command typed will cause print to
  continue. Any number of other commands may intervene before printing
  is continued.

To abort when print is already "paused" (next subsection), resume, then stop
by typing two print commands in succession. This will get you the ABANDON
question; answer Y.

Continuing Print

Whenever printing is "paused" (suspended), printing can be resumed by entering
a print command—P if no file being edited, ^KP if editing. Print can become
"paused" for any of the following reasons:

1. PAUSE BETWEEN PAGES option in use and page completed (earlier in
    this section);

2. ^C print control character (pause until resumed by operator, as for
    typewheel change, Section 7) encountered in file;

3. Print stopped by operator with print command, then ^U entered at
    RESUME question (earlier in this section);

4. Disk full when DISK FILE OUTPUT is in use (an explanatory message is
    also displayed; see discussion in Appendix B).

When printing is "paused", PRINT PAUSE appears in the status line. When
editing, an additional message, TYPE ^KP TO CONTINUE PRINT, is displayed above
the main command menu.

Appendix A
Summary of WordStar Commands

SUMMARY OF EDITING COMMANDS

Commands for Cursor Motion,
Scrolling, and Searching

Commands on this page are displayed as they appear on the keyboard.

Scroll Down	Up	Up
^W	^E	^R
One Line	One Line	One Screen

Left	Left	Right	Right
^A	^S	^D	^F
One Word	One Character	One Character	One Word

Scroll Up	Down	Down
^Z	^X	^C
One Line	One Line	One Screen

Scroll Down	Top of	Beginning
^Q^W	^Q^E	^Q^R
Continuously	Text Area	of File

Replace	Left Side	Right Side	Find
^Q^A	^Q^S	^Q^D	^Q^F
Text	of Screen	of Screen	Text

Scroll Up	Bottom of	End
^Q^Z	^Q^X	^Q^C
Continuously	Text Area	of File

Cursor to	Cursor to Position
^Q0-9	^Q^P
Place Marker	Before Last Command

Cursor to
^Q^K
End of Block

Cursor to	Cursor to
^Q^V	^Q^B
Start of	Beginning
Last Find	of Block
or Source	
of Last Block	

Basic Commands for Entering Text

^V	Insertion ON/OFF	^I	Tab
RETURN	End Paragraph	^O^I	Set Variable Tab
^N	Insert Hard RETURN	^O^N	Clear Variable Tab
^Px	Enter Control Character	^O^F	Set Margins and Tabs from any line in the file

Deletion Commands

DEL	Delete Character Left	^G	Delete Character Right
		^T	Delete Word Right
^Q DEL	Delete to Beginning of Line	^Q^Y	Delete to End of Line

^Y   Delete the Entire Line

^K^Y Delete a Block

Commands for Saving and Abandoning

^K^S	Save File and Resume	^K^D	Save File—Done
^K^X	Save File and Exit	^K^Q	Abandon File

Onscreen Commands

	^O^C	Center a Line	
^O^L	Set Left Margin	^O^R	Set Right Margin
	^O^X	Release Margins	
^O^G	Paragraph Tab	^O^S	Set Line Spacing
	^B	Re-Form Paragraph	

Formatting Toggles

^O^W	WordWrap ON/OFF	^O^H	Hyphen-Help ON/OFF
^O^T	Ruler Line ON/OFF	^O^E	Soft Hyphen ON/OFF
^O^J	Justification ON/OFF	^O^D	Print Display ON/OFF
^O^V	Variable Tabs ON/OFF	^O^P	Page Break Display ON/OFF

Place Marker Commands

^K0-9	Set/hide a Place Marker	^Q0-9	Move to a Place Marker

Find and Replace Commands

^Q^F	Find Text	^Q^A	Find and Replace
^L	Find or Replace again	^Q^V	Restore Cursor to last Find/Replace

<p align="center">Parameters:</p>

n	Find n times	B	Backward Search
U	Ignore Upper/Lower Case	G	Global Search (Replace)
W	Whole Word Search	N	Automatic Replace

<p align="center">Special Find Characters:</p>

^A	Match any character	^Ox	Match any other than x
^S	Match any special character	^N	Match "RETURN, line feed"

Block Commands

^K^B	Mark Beginning of Block	^K^K	Mark End of Block
^K^V	Move a Block	^K^C	Copy a Block
^K^Y	Delete a Block	^K^H	Hide a Block
^Q^B	Move to Block Beginning	^Q^K	Move to End of Block

<p align="center">^Q^V   Move to Block Source</p>

Additional File Commands

^K^W	Write Block to File	^K^R	Read a File into Text
^K^O	Copy a File	^K^E	Rename a File
^K^J	Delete a File	^K^L	Change Logged Disk
^K^F	Directory ON/OFF	^K^P	Print a File

The Help Commands

^J^H	Display and Set the Help Level	^J^S	Status Line
^J^B	Paragraph Re-Form (CTRL B)	^J^R	Ruler Line
^J^P	Place Markers	^J^F	Explanations of Flags
^J^D	Ordinary Dot Commands	^J^V	Moving Text
^J^M	Margins and Tabs		

Miscellaneous Commands

^QQ	Repeat a Function	^U	Interrupt

SUMMARY OF PRINTING COMMANDS

Press ^P before typing one of these print control keys.

Print Control Toggles

^S	Underscore	^X	Strikeout	^H	Strikeover
^B	Boldface	^V	Subscript	^O	Non-Break Space
^D	Double-Strike	^T	Superscript	^Y	Ribbon Color

Other Print Controls

^C	Stop Print	^A	Alternate Pitch	^F	Phantom Space
^K	Right-Left	^N	Standard Pitch	^G	Phantom Rubout
^L	Form Feed	^J	Line Feed	^M	Overprint Next Line

Ordinary Dot Commands

Table A-1. Summary of Dot Commands

Command	Function	Units	Default
.LH	Line Height	1/48 inch	8 = 6 lines to the inch
.PL	Paper Length	lines	66 default lines = 11 inches
.MT	Margin at Top	lines	3 default lines = 1/2 inch
.MB	Margin at Bottom	lines	8 default lines = 1 1/3 inch
.HM	Heading Margin	lines	2 default lines = 1/3 inch
.FM	Footing Margin (page # margin)	lines	2 default lines = 1/3 inch
.PC	Page # Column	columns	1/2 default right margin
.PO	Page Offset	columns	8 default columns = 4/5 inch
.PA	new Page		
.CP	Conditional Page	lines	
.HE	Heading		blank
.FO	Footing		page number at .PC column
.OP	Omit Page #'s		
.PN	Page Number		1
.CW	Character Width	1/120 inch	12 for standard pitch, 10 for alternate pitch
.SR	Subscript Roll	1/48 inch	3
.UJ	Microjustify	OFF(0)ON(1)	ON (1)
.BP	Bidirect. Print	OFF(0)ON(1)	ON (1)
.IG	Comment (also ..)		

Table A-2
Character Pitch

Pitch (characters per inch)	Dot Command
5	.CW 24
6	.CW 20
7	.CW 17
8	.CW 15
10	.CW 12
12	.CW 10
15	.CW 8
20	.CW 6
24	.CW 5
30	.CW 4

Default — 10

Table A-3
Line Heights

Lines per inch	Dot Command
2.0	.LH 24
2.4	.LH 20
2.6	.LH 18
3.0	.LH 16
4.0	.LH 12
4.8	.LH 10
5.3	.LH 9
6.0	.LH 8
6.8	.LH 7
8.0	.LH 6
9.6	.LH 5

Default — .LH 8

SUMMARY OF MAILMERGE COMMANDS

This section briefly summarizes variables, data files, and the MailMerge dot commands. Refer to the text (Sections 9-12) for introductory explanations and additional detail.

Variables

A MailMerge variable is a symbolic name for a data item (text) which may be different in each of several letters or other documents printed by MailMerge from the same document file.

A Variable name consists of a letter followed by 0 to 39 additional letters, digits, and/or (hard) -'s. The variable name (without &'s) is used in dot commands that establish the variable's value.

Examples: NAME
               ADDRESS1
               DATE-TODAY

A Variable reference, or place where the variable's current value is to be inserted, consists of an &, the variable's name, and another &. Spaces are allowed between the &'s and the variable name, but (hard) spaces are not allowed within the name. Soft spaces and soft carriage returns are ignored between the &'s and the variable name, and after a soft hyphen (which is also ignored) within the variable name.

Examples: &NAME&
               &ADDRESS1&
               & DATE-TODAY &
               &ADDRESS5/O&

/O in a variable reference causes that LINE to be omitted from the printout if the variable is null and the rest of the line is blank.

Variable values (the data to be inserted at references to the variable) may be 0 to 200 characters long. A variable may be given a value in three ways:

    From a data file (via .DF and .RV)

    Keyed in by the operator during MailMerge (via .AV)

    Set within the document or an invoking document (with .SV)

A variable must be given a value before it is used. References to undefined (no value yet given) variables are printed. &'s not enclosing valid, defined variable names are printed, permitting normal use of & in text.

Data Files

A data file used with MailMerge to supply names and addresses when printing
form letters or other documents consists of data items (variable values;
fields) separated by commas, with a carriage return after the last item of the
group of items to be used in one letter (or other document).

There must always be the same number of items on a line (record), with commas
present to "hold places" for any items which are omitted.

To include a comma, or leading or trailing blanks, in an item, enclose the
item, or at least the comma or blanks, in quotes(").

Data files may be prepared with WordStar (use the N command) or DataStar.

For DataStar compatibility, any data file line containing FF hex or 7F hex in
the first byte is ignored.

Example: three valid lines (records) of a data file:

> NORCAL Computers,1500 Highland Avenue, "Alameda, California", 94501, Mr. Smith
> TRIAD, 1829 Santa Clara Road, "Malad City, Idaho", 83251, John
> Wolcott Associates, 16 Rue Diesal, "Casteau, Belgium", APO 09055, Mr. Baudoin

(Carriage returns may be used as an alternative to commas between items. Such
use improves screen readability when the data file is created with WordStar,
but use of carriage returns is discouraged because it reduces MailMerge's ten-
dency to get "back in sync" after an omitted data item or comma, and because
it prevents processing the data file with SuperSort to select records or place
them in alphabetical or Zip Code order.)

Form Letter Using Data File

```
.OP                          omit page numbers
.DF datafilename
.RV variable1, variable2, variable3, . . .   (must match data file)

      text of letter, using &variable&'s as desired

.PA                          start next letter on new page
```

Form Letter Using Operator Data Entry

```
.OP                          omit page numbers
.CS                          clear screen (optional)
.AV "prompt", variable1
.AV "prompt", variable2
  . . .                      (one .AV for each variable)

      text of letter, using &variable&'s as desired

.PA                          start next letter on new page
.FI nameofthisfile           (if automatic repeat desired)
```

"Document" to Print/Check Data File

        .DF datafilename
        .RV variable1, variable2, variable3, . . .

        .CP n   n=# variables
        &variable1&
        &variable2&
        &variable3&
         . . .

Two Useful Command Files

<u>Operator Entry of Data Once at Beginning of Form Letter Run</u>

        .AV "Today's date", date
        .FI letterfile   letterfile is a document in one of the
        ..   forms shown above, using &date& where
                                today's date should print.

<u>Operator Entry of Data File Name</u>

        .AV LETTERFILENAME
        .AV DATAFILENAME
        .FI &LETTERFILENAME&   letter file whose name operator enters
        ..   is a document in data file form shown
                                above, but containing
                                .DF &DATAFILENAME&

MailMerge Dot Commands

MailMerge also does the regular print dot commands (Section 7). In the
following tables (A-4 and A-5), brackets enclose optional parameters.

Table A-4. MailMerge Dot Commands

Command	Function
.DF filename [CHANGE]	**Data File:** Specifies data file to be used. CHANGE, if given, requests diskette change.
.RV variable1, variable2,...	**Read Variables:** Gives names and order of variables to be read from data file. List of one or more variable names must correspond in number and order to data items in data file.
.RP [n]	**Repeat:** If n given, document is processed n times. If n omitted, document is processed until data file exhausted. The function of .RP with no n is included in .DF; command is needed only if a different (inserted) document is to be repeated.
.SV variable, value	**Set Variable** within document: named variable is set to value on rest of line.

Table A-4. MailMerge Dot Commands (Continued)

Command	Function
.AV ["prompt"], variable, [length]	**Ask Operator for Variable Value:** Prompts on screen and allows operator to enter data. "prompt" optional prompt text, in quotes. If omitted, variable name used. variable identifies variable for which operator will enter data. length optional maximum length
.DM [message]	**Display Message:** Displays message (rest of line) on screen. Leaves blank line if message omitted.
.CS [message]	**Clear Screen** and display optional message.
.FI filename [CHANGE]	**File Insert:** Specified file is inserted in printout at position of .FI command. File will be inserted multiple times (processed repeatedly) if it contains .DF/.RV or .RP.

The commands after .PF in Table A-5 are effective only if .PF ON has been given, or if a variable reference has already been seen in the current paragraph. For each, DIS is the default and means "match the input".

Table A-5. MailMerge Dot Commands
for Print-Time Line-Forming

Command	Function
.PF ON/OFF/DIS	**Print-Time Line-Forming** ON or OFF or DIScretionary. DIScretionary (default) means form lines from variable reference to end of paragraph only.
.RM n/DIS	**Right Margin** 1 to 240 or DIScretionary.
.LM n/DIS	**Left Margin** 1 to 240 or DIScretionary.
.LS n/DIS	**Line Spacing** 1 to 9 or DIScretionary.
.OJ ON/OFF/DIS	**Output Justification** ON or OFF or DIScretionary.
.IJ ON/OFF/DIS	**Interpret Input as Justified** ON or OFF or DIScretionary: affects method of determining right margin if .RM DIS is in effect, and determines output justification if .OJ DIS is in effect.

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Appendix B
WordStar Error Messages

This appendix contains explanations of WordStar's error and warning messages. Additional error messages that can occur while INSTALLing WordStar are described in the **Installation Manual.**

THE DISK TEXT FILE

Many of WordStar's messages are read in from a disk file WSMSGS.OVR as they are needed for display. This includes most error messages, the menus, and many explanatory messages. The messages are stored in a disk file in order to reduce WordStar's RAM requirements while allowing full, understandable message and explanation texts and multiple menus.

When WordStar is in use, the file WSMSGS.OVR should always be on the diskette in drive A. If diskettes are changed during WordStar use, be sure to keep a diskette containing WSMSGS.OVR in drive A at all times. Operation of WordStar without WSMSGS.OVR present is normally an error, but experienced users may operate WordStar thus if desired.

If the message text file is not present, the following message appears:

    @@@@
    File WSMSGS.OVR not found. Menus &
    messages will display as @@@@ only.

WordStar will continue running, but many messages will be replaced with "@@@@"; in particular, the menus will appear as @@@@ only. Hence WordStar sets the "Help Level" to 0 if WSMSGS.OVR is not present to minimize the display of messages and menus.

THE ERROR RELEASE KEY

A number of the edit function errors require the user to hit the ESCAPE key after the error message is displayed. This is to make sure the message stays on the screen until read, and to insure that WordStar does not proceed to the next command even if the user has typed ahead. The messages for most of these errors have the form:

    *** ERROR n: (specific message) *** Press ESCAPE Key ▮

When such a message is displayed, WordStar forgets any typed ahead characters and ignores further input until an ESCAPE is typed. Editing then continues; the command that caused the error usually will have made no change in the file and not moved the cursor.

If such an error occurs when the disk message text file (previous subsection) is not available, the message will appear as:

    *** ERROR n: @@@@ *** Press ESCAPE Key ▮

The @@@@ is printed in place of text that would have been obtained from WSMSGS.OVR had that file been present. The number (n) remains the same, so the message may be found in the following section.

EDIT FUNCTION ERROR MESSAGES

*** INTERRUPTED *** Press ESCAPE Key ▮

Occurs when the "interrupt" key, ^U, is pressed. This isn't actually an error, but the error message mechanism is used to call attention to the fact that the command in progress has been aborted and/or additional typed-ahead characters have been discarded. Hit the ESCAPE key and continue editing. Does not occur if ^U is typed when there is nothing to interrupt.

*** NOT FOUND: string *** Press ESCAPE Key ▮

Occurs when the Find (^QF), Replace (^QA) or Find/Replace Again (^L) command cannot find the specified string between the cursor position and the end of the document (beginning if B option used). The user's answer to the FIND? question is included in the message. The cursor is left at the end (beginning) of the document.

The ^QV command may be entered after a NOT FOUND message to return the cursor to the starting point. If a repeat count or the G option was given, this will be the position of the last occurrence found. Also, ^QP may be entered immediately after hitting ESCAPE to return the cursor to the position where the command was given, even if a count or the G option was used.

When a repeat count is specified, this message will occur if fewer occurrences are found. With the G (global) option, the message will occur only if no occurrences are found.

*** ERROR E5: THAT PLACE MARKER NOT SET *** Press ESCAPE Key ▮

You gave a "move cursor to place marker" command for a place marker that you have not set since you began editing the file you are now editing. As described above, press the ESCAPE key to release the error message and continue.

*** ERROR E6: BLOCK BEGINNING NOT MARKED
            (OR MARKER IS UNDISPLAYED) *** Press ESCAPE Key ▮

You gave a block move (^KV), block copy (^KC), block delete (^KY), or block write (^KW) command without first marking the beginning of the text to be operated on with the mark block beginning command (^KB). As with all error messages containing "Press ESCAPE Key", press the ESCAPE key to release the error.

To tell WordStar where the beginning of the block of text to move, delete, etc. is, position the cursor on the first character in the block, and type ^KB. After marking both the beginning and the end, repeat the command that yielded the error.

ERROR E6 also occurs after "hiding" (undisplaying) the block beginning
marker with ^KB (cursor already at marker) or with block hide/display
(^KH). In these cases the existing marker can be redisplayed with
another block hide/display command (^KH).

*** ERROR E7: BLOCK END NOT MARKED
            (OR MARKER IS UNDISPLAYED) *** Press ESCAPE Key ■

Similar to error E6 except end is not marked. To tell WordStar where the
end of the text to operate on is, place the cursor on the CHARACTER AFTER
the last character to move, delete, etc, and type ^KK. After marking the
end of the block (or causing the marker already set to display), repeat
the command that gave the error.

*** ERROR E8: BLOCK END MARKER BEFORE BLOCK BEGINNING MARKER
*** Press ESCAPE Key ■

You have put the end marker earlier in the file than the beginning
marker, and it is not clear to WordStar what text to block move, copy,
delete, or write. Correct the markers, then reissue the command that
gave the error.

*** ERROR E9: BLOCK TOO LONG -
            MOVE OR COPY IN TWO SMALLER BLOCKS *** Press ESCAPE Key ■

The amount of text between the beginning and end markers is more than
WordStar can block move or copy. Operate on it in two or more smaller
pieces.

Users with minimal RAM will see this message a lot; with more RAM, it
will occur less often. The number of characters that may be in a block
is about 500 in the smallest RAM that WordStar will operate in and every
added K of RAM adds 1024 characters to the maximum block size. Adding 8K
of RAM memory to your system adds about 8000 characters to the block
size, making it possible to move seventeen times as much text.

The block write command is not subject to any block size limitation.

*** ERROR E10: CURSOR NOT IN RANGE FOR COLUMN MOVE / COPY
*** Press ESCAPE Key ■

In the 3.0 version of WordStar, neither column move nor column copy is
possible when the cursor lies in a negative print position or past column
240.

*** ERROR E11: THAT FILE EXISTS ON DESTINATION DISK.
            DELETE EXISTING FILE FIRST,
            OR USE A DIFFERENT DISKETTE.   *** Press ESCAPE Key ■

This message only occurs when you have specified that a file on one
diskette be edited and the new version be placed on a different diskette.
See "Starting WordStar", Section 1 and the D command in Section 1. This
message indicates that a file with the same name and type already exists
on the destination drive (the second drive name given). If WordStar
proceeded in this situation, the existing file on the destination
diskette would be lost. This error prevents inadvertent file destruction.

After the ESCAPE key is pressed, WordStar goes to the no-file menu; the requested edit is not initiated. From the no-file menu you can delete the existing file if desired, then re-invoke the edit with the D command. Alternatives include inserting a different diskette to accept the destination file, and exiting to the operating system and using the REName command to change the name or type of one of the files.

Can't edit a file of type .BAK or .$$$
-- rEname or cOpy the file before editing

Occurs at D or N command from no-file menu if the file name entered ends in .BAK or .$$$. The edit is not initiated and the no-file menu remains on the screen. If you really wish to edit the file, rename (with the E command) the file to a different type. Alternately, for a file of moderate size, you could edit a new file name and then read the .BAK or .$$$ file into it with the additional file read (^KR) command.

ALLOW PRINT TO FINISH BEFORE EDITING A FILE.
YOUR SYSTEM DOES NOT HAVE ENOUGH MEMORY TO
PERMIT SIMULTANEOUS EDITING AND PRINTING.

Occurs at D or N command from no-file menu if the print function is in use and your system has relatively little memory, or the operating system is not relocated to make all memory present available to WordStar (see description of error F25 in this appendix). The edit is not initiated; the no-file menu remains on the screen. See the **Installation Manual** with regard to memory requirements.

*** ERROR E12: DISK FULL *** Press ESCAPE Key ▮

The diskette is full. May occur when moving cursor towards beginning of a large file (see "Long Documents," Section 6), in which case it will still be possible to move the cursor toward the end of the file and to save your work. If it occurs while moving cursor forward or while saving, you are probably out of luck. **DON'T LET YOUR DISKETTE GET FULL!**

To prevent full diskettes, check your file sizes and disk space frequently with the system STAT command, and keep lots of extra space on each of your diskettes. See the **General Information Manual** for further discussion of diskette space.

Suggestions for recovering from a DISK FULL error:

1.   If cursor was being moved toward the beginning of a large file (see Section 6), it may still be possible to move it toward the end. In that case, get back to the beginning by SAVING with ^KS, then move FORWARD to the desired position.

2.   If cursor was being moved toward end of the file, or the DISK FULL error occurred while saving, first delete (^KJ command) any unneeded files. You could also delete any file that you know you could replace later from another diskette, including WS.COM or even WSMSGS.OVR. Proceed with your edit, and remember to arrange more diskette space (e.g. by moving some documents to a different diskette) after saving.

3. If deleting files doesn't allow you to complete your edit, and you don't have much work to lose, abort the edit, make more diskette space available (erase unwanted files or move some files to another diskette), then repeat the edit.

4. If you have made substantial changes or additions, and thus don't want to abort the edit, yet can't get enough space to complete the edit by deleting files, one of the following drastic measures may work:

    a. If there is extra space on a diskette in the other drive, try putting the changed portions of the file on it with block write. Then recombine in a subsequent edit after arranging more diskette space.

    b. Delete unchanged portions of the file until saving does not yield a DISK FULL error. Then recover these portions from the BAK file or from a previous backup copy you (hopefully) kept.

    c. Desperate measure; use only with extreme caution and only if you have a lot of work at stake: if the entire original file has been read, that is, if you can do a ^QC command and see the end of the file on the screen, delete the input file with the ^KJ command. Then save. WordStar may bomb out with a fatal error F29, in which case your file will have type $$$. Use the rEname command to reestablish the type. There will be no BAK file. Arrange for more diskette space and make a backup copy.

5. If the DISK FULL arises out of a block write (^KW) command, the above recoveries are not relevant. Delete (^KJ) the file written, as it is incomplete and not "closed". If you can arrange additional disk space by deleting other files or using a different drive, repeat the block write. Then proceed with your edit.

Sometimes as soon as you hit the ESCAPE key, another DISK FULL error will occur. In this case your diskette is really full and you are out of luck. Don't let this happen — watch your disk space!

THE BEST CURE FOR DISK FULL ERRORS IS PREVENTION!

*** ERROR E13: COLUMN READ / WRITE NOT ALLOWED *** Press ESCAPE Key ▌

The 3.0 version of WordStar does not allow column read/write. You can, however, duplicate the effects.

To read a column into one file from another, first change column mode to block mode with ^KN; then read a block containing the column to the end of the destination file. Turn column mode on again (^KN), mark the column desired, and move the column to the desired location with ^KV. Finally, delete the remainder of the text block from the end of the file.

To write a column from one file to another, copy the column, with column mode ON, from its original spot to the end of that file; then change to block mode (^KN) and write the column to the second file. Delete the column from the end of the original file.

FILE name.typ NOT FOUND

The file named in response to the FILE NAME? question asked by the addi-
ional file read command (^KR) or the print command (Section 8) does not
exist. The actual name you typed appears in the message; the message
appears on the screen below the **FILE NAME?** question, and the cursor is
replaced after the question. Enter the corrected name -- be sure you
include the drive if needed — or just enter **RETURN** if you don't want to
complete the command. Forward cursor (^D) and ^R can be used to bring
back characters from the previous answer without retyping them (Section
1).

INVALID FILE NAME: xxxxxx

Similar to the previously described error; whatever you typed in response
to the question (echoed back in the message where xxxxxx is shown above)
was not a correctly formed file name. File naming is described in the
General Information Manual and is detailed in your system documentation;
the D command summarizes the form of file names on the screen.

Note

WordStar will not accept "wild card" file names containing * or
?; those characters get the above error.

*** INTERNAL ERROR I15: INVALID COPY LENGTH *** Press ESCAPE Key ▮

*** INTERNAL ERROR I16: INVALID ADDRESS *** Press ESCAPE Key ▮

*** INTERNAL ERROR I17: MEMORY FULL *** Press ESCAPE Key ▮

*** INTERNAL ERROR I18: MEMORY SHORTAGE *** Press ESCAPE Key ▮

*** INTERNAL ERROR I19: POINTER > 64K FROM CURSOR *** Press ESCAPE Key ▮

*** INTERNAL ERROR I36: BAD OVLY # *** Press ESCAPE Key ▮

The above are internal errors which should not occur. If one does occur,
saving immediately and exiting to the operating system is recommended.
Make a copy of the .BAK file, as the internal error may have garbled your
document. Then reinvoke WordStar and check your file. If one of these
errors is reproducible (i.e. if you can find a reliable way to make it
happen again), please report it to MicroPro International Corporation.

WARNINGS

The following are warnings, for your information. See also Print Function
Warnings.

*** WARNING: WORD TOO LONG TO FIT MARGINS

When forming a line, WordStar found more characters than would fit be-
tween the currently set left and right margins with no word break (space
or hyphen). For example, if you type a line of *'s accross the screen,
(e.g. as part of a table heading), with word wrap on and the margins not
released, this message will appear when it gets wider than the margins.
You can leave it too wide, or delete the excess *'s, depending how you
want the page to appear. The message will also appear on a "word" too
long during paragraph reform (^B).

When a "word" is too long, WordStar looks about 10 characters beyond the
margin for a break. If found, it is used, and the "word" is allowed to
pro-ject into the right margin. If not found, the word is split AT the
margin.

CAN'T DISPLAY PAGE BREAKS IN A NON-DOCUMENT FILE

An ^OP command was given during a "non-document" edit invoked with the N
command (Sections 1 and 6). The command was disregarded.

PUT AT FILE BEGINNING FOR CORRECT PAGE BREAK DISPLAY

This appears, highlighted, ON THE SCREEN LINE with a .PL, .MT, .MB, or
.LH dot command that is preceded by document text (anything, including
blank lines, other than dot commands) when page break display is on. The
intent of this message is to remind you that dynamic page break display
will not pick up and respond to this dot command, and thus may show
different page breaks during editing than will occur on printout. The
command is nevertheless entered into the file, and will be interpreted by
the print function. The message is on the screen only; it is not entered
into your document. This message does not appear if page break display
is off (^OD command) or during non-document edits (N command, Section 6).

?

A question mark appears in the rightmost screen column, highlighted,
opposite incomplete or apparently erroneous dot commands. An unrecog-
nized two-letter code, a missing numeric argument where required, or a
number greater than 255 (except with the .PN command) will cause a ? to
display. Also appears as a command is being entered; disregard until
command is fully typed. Does not appear during non-document edits (N
command, Section 6).

File WSMSGS.OVR not found. Menus & messages will display as @@@@ only.

Occurs when WordStar is started, when at the no-file menu, and/or when
editing of a file is initiated if the message text (WSMSGS.OVR) is not
found on the diskette in drive A: nor on the diskette in the current
logged drive. See "The Disk Text File" in this appendix.

@@@@

> The disk text file WSMSGS.OVR is not present, and WordStar tried to
> display some message or menu (including the no-file menu) from that file.
> See "The Disk Text File" at the beginning of this section.

Note

> The most common and important error messages will display even
> if WSMSGS.OVR is not on line, or will display part of their
> text (including the error number, if any), followed by @@@@.
> However, the menus will be completely unavailable and only @@@@
> will appear at the top of the screen.

*** WARNING:
WRONG VERSION OF WSMSGS.OVR --
SOME MESSAGES MAY BE INCORRECT ***

> Occurs if the disk text file WSMSGS.OVR in use is that from a different
> release than the WordStar (WS.COM) being run. The message file may not
> contain all of the correct messages; some messages may be absent.
> WordStar execution continues; an attempt to display a message not in the
> text file will yield: IF THIS DISPLAYS YOU ARE USING WRONG VERSION OF
> WSMSGS.OVR.

> Exception: the first release of WSMSGS.OVR did not contain the WRONG
> VERSION OF WSMSGS.OVR warning; use of a later WS.COM with the earliest
> WSMSGS.OVR will cause IF THIS DISPLAYS THERE IS A BUG to display.

!'s and beeps

> !'s appear on the screen, wherever the cursor happens to be, usually
> accompanied by beeps from the terminal, when WordStar is receiving
> keyboard input at a faster rate than it can process and has exhausted its
> capacity to store characters for later processing. This normally occurs
> only when using the REPEAT key on the terminal, or holding down an auto-
> repeat key. The !'s and beeps are to warn you that WordStar is losing
> keystrokes; stop typing or release the key you are REPEATing when they
> occur. After processing all characters not missed, WordStar will re-
> display the screen, removing the !'s. You may then continue editing.

*** WARNING: DISK FULL,
     DELETING OLD .BAK FILE TO MAKE SPACE
     (NORMALLY, THE PREVIOUS BACKUP FILE IS DELETED
     ONLY AFTER EDIT IS SUCCESSFULLY COMPLETED).

If you are working with files of moderate size, take this as a warning
that your diskette is filling up. Save the document you are working on,
and make more diskette space available (by deleting unwanted files, or
moving some files to new diskettes) before proceeding. See the **General
Information Manual** about diskette space and file sizes and about .BAK
files.

When working with files so large that three copies of the file cannot fit
on a diskette (two copies if you have specified a different destination
diskette), this message will always occur in the course of an edit.
Disregard it. See Section 6, "Long Documents."

WARNING: You are editing the same file as you are printing.
WordStar will not allow you to save the edited version
until the print has completed or has been abandoned.

WordStar permits editing and printing the same file at the same time, but
the edited version cannot be saved while the print is in progress. When
you initiate editing of the file that is being printed, the above warning
message is displayed.

INFORMATIONAL MESSAGES

FINISHING PRINT BEFORE EXIT
(type ^U to cancel exit command) ...

Occurs if an X command from the no-file menu, or a ^KX command while
editing, is given while the print function is active. Printing will con-
tinue; the exit to the operating system occurs when printing completes.

FINISHING PRINT OF SAME FILE BEFORE SAVING
(Type ^U to cancel Save command) ...

Occurs when any Save command (^KD, ^KS, ^KX) is given while the file that
is being edited is also being printed. WordStar will wait for the print
to complete, then save. If you wish to use other commands before the
print and save are complete, interrupt the save command by typing ^U.
Note that if printing is paused, WordStar will wait forever if left to
itself. In this case, type ^U to cancel the save command, then issue the
appropriate commands to continue or abandon printing.

FINISHING PRINT OF .BAK FILE BEFORE SAVING
(Type ^U to cancel Save command) ...

Occurs if any Save command.is given while printing the .BAK file of the
file being edited; similar to preceding message.

FATAL ERRORS

The following errors terminate WordStar execution and return control to the
operating system.

You are attempting to run an uninstalled WordStar.
Please run INSTALL first.

Occurs upon invoking the uninstalled WordStar (file WSU.COM) supplied on
the distribution diskette. Before attempting to run WordStar, "Install"
WordStar for your particular terminal and printer by invoking the INSTALL
program, also supplied on the distribution diskette, and answering the
questions it asks. See the **WordStar Installation Manual** for details on
installation.

*** FATAL ERROR F23: INVALID SCREEN HEIGHT OR WIDTH

This can occur only after an error has been made in custom installation by "patching" as described in the **Installation Manual.** The screen height is set less than 16 or greater than 120 lines, or the screen width is set less than 64 or greater than 250 columns.

*** FATAL ERROR F25: NOT ENOUGH MEMORY
**   OR YOUR OPERATING SYSTEM IS NOT**
**   RELOCATED TO MAKE ALL RAM AVAILABLE**

Occurs when WordStar is started. Not enough memory is available for WordStar to operate in. See the **Installation Manual** for memory requirements. Note that your operating system (CP/M or equivalent) must be "relocated" to operate at the top of memory; this is accomplished with a system command, sometimes called "CPM", "MOVCPM", or "RELOC". See your system documentation. Whenever more memory is added to your system, such relocation must be repeated before the memory will be used.

*** FATAL ERROR F27: DISKETTE DIRECTORY FULL

The number of file directory entries a diskette can hold has been exceeded. This happens rarely, as the byte capacity is usually the ruling factor, but if you use many small files, such as 1-page letters or paragraphs of boiler plate, you may find it necessary to watch your file count.

The maximum number of file directory entries on a diskette is system-dependent but is often 64 entries on single density diskettes. Each file requires one entry, and any file over 16K (about 16000) characters long requires an additional entry for each additional 16K or fraction thereof. When counting files remember that WordStar can generate two working files, each possibly as long as the file being edited.

*** FATAL ERROR F28: CLOSE FAILURE
**   SYSTEM FAILURE, OR YOU CHANGED DISKETTES**

*** FATAL ERROR F29: RENAME FAILURE
**   SYSTEM FAILURE, OR YOU CHANGED DISKETTES**

These messages should not occur; they indicate some sort of operating system error has occurred, or you changed the diskette in a drive during an edit, or you deleted the input file or the work file with the ^KJ command.

*** FATAL ERROR F46: Overlay file WSOVLY1.OVR Not found

The file WSOVLY1.OVR must be on the disk in drive A (or the current logged drive) when WordStar is invoked. Copy the file from the distribution diskette (or log the drive containing the file), then re-invoke WordStar.

PRINT FUNCTION MESSAGES

The following messages can occur during the dialog to initiate printing:

FILE name.typ NOT FOUND

INVALID FILE NAME: xxxxxx

> Name of a non-existent file, or an invalidly formed file name, entered.
> Descriptions earlier in this appendix apply.

WARNING: You are printing the same file as you are editing.
The last saved version will be printed, not reflecting un-
saved changes. Furthermore, WordStar will not allow you to
save the edited version while the print is in progress.

> This warning occurs when the ^KP command is used to initiate print and
> the file name entered is that of the file being edited. The warning
> reminds you that WordStar does not permit saving (^KD, ^KS, ^KX) while
> the same file is being printed, and that WordStar prints only disk-saved
> files — edits you have not yet saved will not be printed.

END EDIT (^KD) BEFORE STARTING PRINT.
YOUR SYSTEM DOES NOT HAVE ENOUGH MEMORY TO
PERMIT SIMULTANEOUS EDITING AND PRINTING.

> Occurs when the ^KP command is given if your system has insufficient RAM
> to support concurrent printing and editing. (May also occur if your
> operating system isn't relocated to make all RAM available; see the
> description of error F25 in this appendix.)

When DISK FILE OUTPUT is in use, the following can occur:

*** FATAL ERROR F27: DISKETTE DIRECTORY FULL

> As described in this appendix.

***   PRINT OUTPUT DISK FULL. PRINT PAUSED.   ***

> Occurs when the diskette on which the print output file is being written
> becomes full. A print pause is automatically invoked; PRINT PAUSED
> appears in the status line as usual. After this message, you may make
> additional diskette space available (for example, by deleting files; see
> discussion of ERROR E12 earlier in this section), then continue the print
> with the usual command (P on no-file menu, or ^KP while editing). If you
> continue the print without making more diskette space, the PRINT OUTPUT
> DISK FULL message will recur after about a second.

> If you wish to abandon the (paused) print after the output diskette has
> filled up, type two print commands in rapid succession, then answer Y to
> the question evoked by the second print command — that is, at the no-
> file menu, type PPY; while editing, type ^KP^KPY. After abandoning, you
> will probably want to delete the disk output file, since it will be
> incomplete and not "closed". Be sure to abandon the print before dele-
> ting the file.

Other than the above, the regular print function has no error messages - other
conditions, such as invalid dot commands, are handled by ignoring the command
or making an assumption. See Section 7.

SOME OPERATING SYSTEM MESSAGES

These are some of the messages from the operating system that may arise in
conjunction with WordStar use. Texts vary from system to system; those shown
here are typical only. Refer to your system documentation.

LOAD ERROR or TOO BIG

> Occurs at attempt to invoke WordStar if you have far too little memory,
> or your operating system is relocated for far too little memory. This
> message means that the WordStar program (WS.COM) won't fit in the memory
> available.

DISK d: NOT READY

> Means that WordStar accessed a diskette drive that contained no diskette,
> or the diskette was present but the drive door was not closed. WordStar
> always requires a diskette in drive A, and in the current logged drive if
> other than A, as well as in any drive addressed by a WordStar command.
> Most systems will proceed when the diskette is inserted. The message may
> appear if a diskette is inserted and a command is then given without
> waiting a few seconds; in this case, disregard it.

BDOS ERR R/O

> Occurs on some systems if you change diskettes when you shouldn't, or
> changed diskettes when at the system prompt (A>) and neglected to type
> ^C. If you get this message, reread the section in the **General Informa-
> tion Manual** about diskette changing.

MISCELLANEOUS ERROR MESSAGES

*** ERROR E38(-42): BAD OVERLAY FILE, OR
WRONG VERSION OVERLAY FILE *** Press ESCAPE Key ▮

*** ERROR E43(44): WRONG VERSION OVERLAY FILE *** Press ESCAPE Key ▮

> The above errors are usually caused by using an incorrect version of
> WSOVLY1.OVR (from a different release of WordStar), or by the WSOVLY1.OVR
> file having been damaged through a system failure or an error in copying.
> Make a new copy of WSOVLY1.OVR from your distribution diskette. If the
> problem persists, see your dealer for assistance.

*** ERROR E46: Overlay file WSOVLY1.OVR Not Found *** Press ESCAPE Key ▮

> The WSOVLY1.OVR file (supplied on the distribution diskette) must be on a
> disk in either drive A or the current logged drive.

*** ERROR E47: FILE MAILMRGE.OVR NOT FOUND
            (The separately supplied file MAILMRGE.OVR
            is required for use of MailMerge.)   *** Press ESCAPE Key ▮

This message will be displayed if M is entered at the no-file menu and
the file MAILMRGE.OVR is not on the disk in drive A or on the disk in the
current logged drive.

*** ERROR E52: PROGRAM IS AN EMPTY FILE!? *** Press ESCAPE Key ▮

This message may be displayed when the name of a file which is not a
valid program is entered during use of the R command of the no-file menu.

*** ERROR E53: PROGRAM TOO BIG FOR
MEMORY AVAILABLE UNDER WordStar *** Press ESCAPE Key ▮

There is not enough memory on your system to run the specified program
under WordStar. To run the specified program, you must exit from Word-
Star.

File WS.COM Not Found --
Can't Run a program unless WS.COM is available.

WS.COM (or other filename assigned when INSTALLed) was not found on
either the disk on drive A or on the current logged drive. WS.COM must
be available in order to return to WordStar after completing the speci-
fied other program.

Note

This error will occur if WS.COM has been renamed since
INSTALLation. If you wish to change the name of your WS.COM
file, you must re-INSTALL. To re-INSTALL without remaking all
the installation selections, use installation option B or C
(**Installation Manual**), enter the existing file name and the
desired new file name at the appropriate prompts, then use the
RETURN key at each menu to keep the present selection.

FILE d:filename.typ ALREADY EXISTS

The new file name specified in the rEname command already exists. Choose
a different name or rEname the existing file.

FILE d:filename.typ NOT ON SAME DRIVE

Both filenames specified for the rEname command must be on the same disk
drive; you can not move a file from one drive to another by rEnaming.

TOO LITTLE MEMORY TO COPY WHILE EDITING

Your system does not have enough memory available to copy files while
editing. If you want to copy a file, you must first end or abandon the
current edit.

FILE d:filename.typ EXISTS -- OVERWRITE? (Y/N): ▮

> This message will be displayed if the file specified to be cOpied <u>to</u>
> already exists. Press Y to erase the existing contents of the file and
> proceed with the copy. Press N to leave the existing file undisturbed;
> the NAME OF FILE TO COPY TO? question is reasked if N is pressed.

MAILMERGE ERROR AND WARNING MESSAGES

MailMerge has a number of error and warning messages, including those de-
scribed here. Unlike the regular print command, MailMerge always displays an
error message for an invalid dot command. Other conditions also produce
messages, such as a file not found, or the data file ending in the middle of
the values required to print another letter. In all cases, printing proceeds
after the error or warning (permitting detection of as many errors as possible
in a single print run), though of course the printout may be incomplete or
incorrect.

*** Invalid Dot Command Ignored:

> The erroneous dot command is displayed on the next line. In some cases,
> a specific error message accompanies this message.

*** Insert diskette with file d:filename.typ then press RETURN

> This is not an error message, but a request to insert the diskette
> containing the indicated file into the drive indicated before the file-
> name. This request results from processing of a .DF or .FI dot command
> containing the word "CHANGE" (or anything beginning with "CH") after the
> file name.

*** Cannot change disk in drive d:, request ignored

> This error message occurs when a .DF or .FI dot command containing the
> word "CHANGE" after the file name is processed, and the diskette drive
> specified in the file name (or the logged drive if no specific drive was
> specified) contains a file which is in use by MailMerge, preventing
> removal of the present diskette.

> To avoid this error, we recommend keeping WSMSGS.OVR, WSOVLY1.OVR, the
> main document being printed, the disk output file if in use, and all data
> files and inserted document files used by the main document but not on
> diskettes to be changed, on drive A, and use drive B (in a two-drive
> system) for CHANGE files, using only one CHANGE file at a time.

> After the above message is displayed, MailMerge will attempt to find the
> file anyway, in case the correct diskette is already inserted. If the
> file is not found, the message described next occurs.

*** File d:filename.typ Not Found

The file specified in a .FI or .DF dot command was not found on the
specified drive, or on the logged drive if no drive was specified in the
command. MailMerge will look further (see next message), then, if the
file is not found, proceed without it: for a .FI command, printing will
continue with the line after the .FI command; for a .DF command, printing
will continue with no data file, in which case a further message will
appear when a .RV command is encountered.

*** But found, and will use, d:filename.typ

After a file was not found (see preceding message), MailMerge looked on
the logged drive and on drive A for a file with the same name, and found
one. This message advises you of this fact. If the file was merely on
the wrong drive (or you had the wrong drive logged), this may be the
correct file. However, if you had a file with the same name but diffe-
rent contents on another diskette, this may be the wrong file and the
resulting printout may be wrong. Check carefully.

*** No .DF before .RV

A .RV command was encountered with no preceding .DF, or the data file
specified in the .DF was not found (as indicated by a preceding message).
If no File Not Found message appears above on the screen, check your
document to make sure the .DF is present and before the .RV. Printing
proceeds with no data supplied for the variables; the variable names and
&'s will print and only one copy will be printed.

*** WARNING: Overlong data value truncated

One or more data items longer than the maximum allowed variable value
length, 200 characters, was read from the data file by a .RV command.
Only the first 200 characters will be used; the excess may be skipped
over or may be used (incorrectly) as the value for the next variable to
be read. May indicate an error in data file format, such as an omitted
second quote (").

*** Invalid variable name in .RV command ignored

One or more of the variable names in a .RV command was not of valid form,
i.e. a letter followed by 0 to 39 additional letters, digits, or -'s.
May indicate that &'s were used around the variable names in the .RV
command; &'s should NOT be used in the .RV command (except in the case of
inserting one previously defined variable value into the .RV command to
determine the name to be applied to another data item read from the data
file).

*** WARNING: Data exhausted, null value(s) used

The end of the data file was reached in the middle of execution of a .RV command — the last record of the data file did not contain the number of items required to print another letter (or other document). The variable names for which no data is present are given "null" values (values consisting of zero characters) and printing proceeds. Printing will normally stop after the letter on which this message occurred is complete.

This message commonly indicates an error in the last record of the data file only, but may indicate use of the wrong data file (one with an inappropriate number of data items per record), or indicate that an omitted item or comma earlier in the file caused the data file to get "out of synch" with the letters. (The latter case of getting and staying "out of synch" can only occur if carriage returns are used in the data file between items for the same letter as well as between records; use of commas only is encouraged to facilitate "re-synching" after an omitted item.)

Note

This message will occur only when the end of the data file is reached, even if earlier errors or the presence of fewer variables in the data file record (line) than in the .RV command has caused incorrect matching of data throughout the print run, because if .RV finds insufficient values on a data file line, it proceeds automatically to following lines until enough data has been found.

Note

Each time the end of a document being repeatedly processed under .DF/.RP is reached, MailMerge looks ahead in the data file, passing up all carriage returns and blanks present, to see if more data is present. If the end of the file is reached before any non-blank, non-carriage return character is found (as it will be after the last letter if the data file matches the document correctly and has a correct last record), then the document is not processed again, and printing terminates without the above message occurring.

If you are printing a document which reads multiple "records" for each printout (on each repetition of processing), the above message may normally occur. For instance, a document that prints 3-up address labels would read three name and address records (typically with three .RV's) on each repetition, then print the three labels. This document would get the above warning at the end unless the number of records in the data file happened to be a multiple of three; the warning may be disregarded in this case. The one or two labels for which no data was present would print blank, since .RV automatically supplies null values for the absent data.

SPELLSTAR ERROR AND WARNING MESSAGES

E101: File not found on disk: d:filename.ext

The file shown in the message was specified as one of the following SpellStar files:

a.   the main or supplemental dictionary for the check operation,
b.   the document file to be checked, or
c.   the file containing words to be added to or deleted from a dictionary.

This file was not located on the drive specified or, in the case of a file with extension name "DCT" or "SUP", was also not located on the currently logged drive.

If the file name or drive was entered incorrectly, restart SpellStar by responding "R" to prompt, then enter the correct file name or extension. If the file name and drive were correct, respond "R" to prompt, then exit to WordStar to find or create the desired file.

E102: Error during sort.

This message occurs whenever the internal SpellStar sort program (MicroPro's SuperSort) encounters any problem executing the requested sort operation. The specific failure will have been explained in a preceding message. See SuperSort reference manual for a detailed explanation of the problem. In most cases, the failure will have been insufficient sort work space.

To recover from the insufficient space condition, respond to the prompt with "R" to restart SpellStar and then either select a different drive for the "work drive" control or change the diskette to one with more available space. If neither of these actions can be taken, exit to WordStar and delete unneeded files from the disk to make available at least as much space as is currently used by the file being checked or the file containing the words to update a dictionary, depending on the operation being performed.

E103: Invalid word format in "add" file.

When executing the Dictionary Maintenance operation, an input word file was specified with the file name extension of "ADD", but the internal contents did not contain the word format expected by SpellStar. The "add" format is unique to files created by WordStar in the spelling correction phase when a word is selected for adding to the main or supplemental dictionaries.

Respond "R" to the prompt to restart SpellStar, exit to WordStar to rename your word file to any name having an extension other than "ADD", then start SpellStar again.

E104: Disk full while writing file d:filename.ext.
      Enter any key to restart.

While writing any of SpellStar's work or output files, the destination
disk became full. SpellStar is unable to proceed.

After hitting any key to restart SpellStar, follow the action described
for error E102.

W110: Invalid character in dictionary. Word Dropped: xxxxx

When adding words to a dictionary, SpellStar encountered a word con-
taining a character other than a letter or the apostrophe character. The
word is shown in the message (replaces the xxxxx). This condition should
not occur and may signal a program failure or some unexpected condition
on disk.

SpellStar will continue after dropping this word from its operation. The
proper word can be added in a later run. If this condition persists
without a reasonable explanation, please notify MicroPro's customer
service department for assistance.

W180: Memory exceeded. Partial words flagged.

In the final phase of SpellStar, there was not sufficient memory in the
computer to hold all of the misspelled words. SpellStar was forced to
flag only the words which would fit and ignore the rest.

After the flagged words are corrected with SpellStar, rerun the correc-
tion operation to examine and correct the remaining words.

W181: Word exceeds max length. Words bypassed.

In the final phase of SpellStar, words of length greater than thirty-five
letters were misspelled. SpellStar can not process these words and
therefore must bypass them.

Words longer than thirty-five letters must be checked for correct
spelling by user examination only.

E190: Insufficient memory for file areas.

There was not enough computer memory to correctly process opening any of
SpellStar's files.

SpellStar requires a minimum of forty-eight K (blocks of 1024 bytes) of
memory. If your system has less memory than this minimum, please contact
MicroPro's customer service department for assistance.

E191: Invalid record format in intermediate file.

This condition occurs when SpellStar encounters an unexpected record format within one of its internal work files.

During the operation a bad sector may have been used by SpellStar. Respond with "R" to the prompt to restart SpellStar, replace the work disk or change the work drive control in the menu, then restart the operation. If the condition persists without a reasonable explanation, please contact MicroPro's customer service department for assistance.

E192: Insufficient memory for table area.

In the final phase of SpellStar, not enough computer memory was available to store the misspelled words found in the text.

SpellStar requires a minimum of forty-eight K (blocks of 1024 bytes) of memory. If your system has less memory than this minimum, please contact MicroPro's customer service department for assistance.

E193: Invalid character format in dictionary.

During the dictionary checking operation, SpellStar encountered an unrecognized characater format in the main or supplemental dictionary. This could be caused by using a non-SpellStar dictionary (that is, one that has not gone through SpellStar's maintenance operation), or could be caused by a disk sector read error.

To restart SpellStar, enter any key. If you were using a SpellStar dictionary, the file may need to be restored from a backup disk to eliminate any sector errors if they occurred. If you were using a dictionary not created by SpellStar, use the dictionary maintenance operation to create a SpellStar dictionary from the file of words. If this error persists without a reasonable explanation, please contact MicroPro's customer service department for assistance.

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WORDSTAR
WITH MAILMERGE & SPELLSTAR

MAILMERGE

Section 9
The MailMerge Option:
Form Letters

The MailMerge command is the enhanced print capability supplied with the MailMerge option package for MicroPro's WordStar 2.0 and later releases. The MailMerge command performs the same function as WordStar's regular print command (except it does not permit using the edit function to edit another document while printing is in progress), with additional capabilities to permit production of form letters, insertion of variable data into a document during printout, insertion of other named files in the printout, and printing multiple duplicate copies of a document.

MailMerge's insertion capabilites include automatic reforming of paragraphs containing insertions, to maintain margin alignment and justified or ragged right appearance matching the input despite varying lengths of inserted texts.

While a major use of the MailMerge command is to produce form letters, Mail-Merge provides many facilities which are useful even in documents of which only a single copy is produced at a time -- such as insertion of boiler plate paragraphs from other files and specification of variable values at the beginning of the document for insertion at multiple places in the text.

The MailMerge package includes Sections 9-12 of this manual and a file (MAILMRGE.OVR) which must be present on the diskette in drive A (or the logged drive) whenever the MailMerge command is to be used.

If your MAILMRGE.OVR file is supplied on a separate diskette, you must run a program called PRIME, also supplied on the diskette, before you use the diskette in **any** way. See the **Installation Manual.** Run PRIME according to the instructions in that manual.

Before attempting to use MailMerge, copy files off the MailMerge distribution diskette, back up the diskette, before making **any** use of the diskette.

OVERVIEW OF MAILMERGE CAPABILITIES

In addition to the capabilities of the regular print command (P or ^KP), the capabilities of the MailMerge command (M on the no-file menu) include those summarized in the following paragraphs. Sections 9-12 explain these capabilities in greater detail.

Inserting Variable Information

MailMerge can insert variable data into a document and automatically print a copy for each set of values. For example, a personalized letter can be produced for each name and address on a mailing list. The letter is prepared with the edit function in the usual manner, with imbedded directives added to control the insertion of data. The texts to be inserted may be read from a data file, entered by the operator during printout, and/or set at the beginning of the document for insertion at multiple places in the document.

Data Files

Data files containing mailing lists or other information to be inserted into
documents may be prepared with WordStar's edit function or with MicroPro's
screen-oriented data entry program, DataStar. The compatible format used also
allows generation of data files by programs in BASIC or other languages.

Inserting Another File

The document being printed may invoke another document file by name during
printout. Printing proceeds as though all text and commands in the inserted
file were present in the invoking file in place of the command (.FI) used to
invoke the insertion. After the inserted document has been completely
printed, printing of the invoking document continues. The inserted document
may in turn invoke insertion of other documents into itself, if desired, to a
maximum "nesting level" of 8 documents. Insertion of variable information and
reformatting may be performed during printout of the inserted file. As with a
main document, a document inserted at print time can be processed repeatedly
as variable information from a data file is merged (inserted) into it.

Boiler Plate Paragraphs

Text used in multiple documents may be entered onto separate files, then later
invoked using the file-insertion facility from other documents as desired.
Variable information, such as the names of parties to a contract, may be
inserted into the boiler plate during MailMerge.

Command Files

A "document" file may consist primarily or only of print directives, with the
actual text printed coming from additional files inserted at print time. This
permits performing complex printing operations with a single operator invoca-
tion, such as printing letters from a mailing list then printing envelopes
from the same mailing list. A large document, such as a book, might be
maintained on a separate document file for each section or chapter; when a
complete printout is desired, a command file could be used to print the
chapters in sequence.

Changing a Diskette

A diskette change can be requested at invocation of a data file or an inserted
document file. Thus, the book mentioned in the previous paragraph could have
chapters on separate diskettes and still be printed with one invocation of
MailMerge.

Screen Display and Input

Commands may be imbedded in a document file to cause messages to the operator
to be displayed on the screen during printout, and to request operator input
of variable information. MailMerge also displays error messages for invalid
commands, and instructs the operator when diskette change is required.

Printing Multiple Copies

A command may be imbedded in a document to cause repeated processing of the document. Such repetition also occurs automatically when variable information is read from a data file. In addition, the operator is given an opportunity to request multiple duplicate copy printing when MailMerge is invoked. This facility complements the repeated processing that may be invoked by commands in the file, permitting production of two or more copies of each letter printed from a mailing list, or two entire copies of the book mentioned in a preceding example.

Print-Time Formatting

The forming of text into lines, normally done during text entry with WordStar's edit function, is also performed by MailMerge. Line-forming (to match the margins of the document being printed) occurs automatically at variable insertions, so that printed paragraphs will appear correct even if the inserted information varies in length. Print-time line-forming may also be invoked by commands in the document, permitting reformatting of boiler plate to match the document in which it is being used, and permitting printout with different margins (or line spacing) than used on the screen during text entry.

The following sections will describe MailMerge's various capabilities. We will start with a commonly used application, producing form letters using a mailing list recorded on a data file, then proceed to operator entry of information during printout, boiler plate, and other applications.

The various commands used in document files to be used with MailMerge will be introduced individually as required; a reference summary in Appendix A reviews all of the commands. Section 12 has a full description of MailMerge operation, including invocation of MailMerge, interruption of printing, and resumption of printing.

FORM LETTERS AND DATA FILES

This subsection introduces a number of MailMerge's capabilities, using a form letter as an example. The techniques described here may be used to produce any document of which multiple copies are desired using variable information which comes from a data file on diskette. (On later pages, we will describe alternate sources for the information which varies from copy to copy of the document).

Suppose you wish to send a letter to all of your customers announcing a new product. Further, let's suppose you wish to maintain a data file on disk containing the names and addresses of all of your customers, so that other communications may easily be sent to them in the future.

The copy of the letter for one recipient might look like the following. Other customers would get similar letters, but with the appropriate company name, address, and salutation.

June 16, 1980

NORCAL Computers
1600 Highland Avenue
Alameda, California
94501

Dear Mr. Smith,

We would like to announce the availability of WordStar
2.0 together with the MailMerge option. We believe
many of the customers of NORCAL Computers will like the
enhanced capabilities provided by the MailMerge option,
including the ability to make attractively-formatted
insertions in mid-paragraph in form letters.

Sincerely,

Chip Pood
Director of Marketing

When preparing a form letter, we suggest that you first roughly type up one
copy to help you identify the parts of the text which will vary from copy to
copy (the "variable information"). The actual document which MailMerge will
use to produce individualized letters is then prepared with the WordStar edit
function in the usual manner, but with special print directives added. (To
print the letters by the method being described here, a separate data file
containing the variable values for each letter is also used, as we will
describe shortly.) The document file from which the letters are printed might
be as follows:

```
.. file EX1.LET
.OP
.DF ADDRESS1.DAT
.RV COMPANY, ADDR1, ADDR2, ADDR3, NAME
```

June 16, 1980

&COMPANY&
&ADDR1&
&ADDR2&
&ADDR3&

Dear &NAME&,

We would like to announce the availability of WordStar
2.0 together with the MailMerge option. We believe
many of the customers of &COMPANY& will like the
enhanced capabilities provided by the MailMerge option,
including the ability to make attractively-formatted
insertions in mid-paragraph in form letters.

Sincerely,

Chip Pood
Director of Marketing

```
.PA
```

A sample printout resulting from using MailMerge with the above document is shown at the end of this subsection.

To make the letter appear hand-typed, the text was entered with justification off (^OJ command). A number of dot commands (print directives with a period in the first character position) were added to the text; we will discuss these shortly. Each place a piece of variable information (text different in each copy) was to print, a symbolic name enclosed in &'s was entered.

Variable Names

In a document into which variable information is to be inserted by MailMerge, each piece of information (each individual variable) is identified by a name chosen by the user. The names may consist of 1 to 40 letters; digits and -'s are also allowed except not as the first character. While we suggest that you choose variable names that represent the type of information to be printed, you may choose any name you wish as long as the same name is always used within the same document for the same piece of information and the name is distinct from the names used in the document for other pieces of information.

In our example, the variable values or data (the actual texts to be printed in each letter) come from a data file. (The .DF and the .RV dot commands shown control the reading of the data file, as will be detailed later.)

Insertion Points

In each place a piece of variable information is to be inserted in the printout, enter an &, the name of the variable, and another &. For example, the line

        Dear &NAME&,

will print as

        Dear Mr. Smith,

if the datum for the variable "NAME" was "Mr. Smith".

The name used for the variable must of course be the same at all places where the variable is used, as well as in whatever dot command (.RV in our example) determines the actual values to print in each letter.

Ampersands (&) are always used before and after a variable name where the variable value is to be inserted in the text.

Ampersands are not used in a dot command that gets the value for a variable, such as the .RV in our example. (If ampersands are used in a dot command, MailMerge will insert the variable's value into the dot command before executing the dot command. This insertion into dot commands has useful applications, some of which will be described later, but incorrect operation will result if &'s are used where not intended.)

Ampersands (&) may also be used in the normal manner in the text as desired.
If there isn't a second & nearby, or if the text between the ampersands is not
the name of a variable which has an associated value, then the ampersands are
printed normally.

You can also see that a number of dot commands, some familiar and some new,
were added to the text in the above example. Recall that a dot command, as
defined in the **General Information Manual,** is a print directive that begins
with a period in column 1. MailMerge can execute all of the regular print dot
commands, as described in Sections 7 and 8.

In the above example, the line beginning with .. is a comment line, passed up
without processing during printing. The .OP command at the beginning prevents
the usual printing of a page number at the bottom of the page. If you want
the page(s) of the letter numbered, omit the .OP and place a .PN 1 at the
beginning of the letter, otherwise the page number will keep increasing
through successive letters. **Always use either .OP or .PN in a form letter.**
The .PA ends the page, causing the next letter to begin at the top of the next
page inserted into the printer. Always place a .PA command at the end of a
form letter.

In addition to the regular dot commands, MailMerge interprets a number of
additional dot commands. In the above example, the .DF and the .RV commands
are MailMerge dot commands used to control the reading of variable values from
a data file. We will describe these two dot commands after introducing data
files.

To print the form letters in our example, a **data file** is necessary. The data
file provides the texts to be inserted in each letter for the variables
COMPANY, ADDR1, ADDR2, ADDR3, and NAME. The data file must be named
ADDRESS1.DAT on the logged disk drive. (A different data file name or drive
could be used in our example by changing the .DF dot command line).

Format of a Data File

A data file consists of lines (records), with each line containing the data
(variable values) to be used in one letter (or other document). Within the
line, the data items (fields) are separated by commas. If a data item con-
tains a comma, enclose the data item in quotes (") to tell MailMerge not to
interpret the comma as a data item separator. After the last data item to be
used in a letter, there must be a carriage return; after the carriage return
(i.e. on the next line) the data for the next letter begins.

The data file (ADDRESS1.DAT) for our example might appear as follows:

        NORCAL Computers,1500 Highland Avenue,"Alameda, California",94501, Mr. Smith
        TRIAD, 1829 Santa Clara Road, "Malad City, Idaho", 83251, John
        Wolcott Associates,16 Rue Diesal, "Casteau, Belgium",APO 09055,Mr. Baudoin

The above data file contains three sets of values (three records) and will
result in the printing of three letters. A data file may, of course, contain
many more sets of values; the size of a data file is limited only by diskette
capacity.

Notice that the values on a line are always in the same order — they corres-
pond in order to the variables COMPANY, ADDR1, ADDR2, ADDR3, NAME in our
letter. The values in a data file must always be in the same order, and the
order must correspond to the order of variable names in the .RV command (to be
detailed shortly) in the letter.

Note that quotes were used around the "city, state" items in each line. These
are values for the ADDR2 variable; the quotes indicate that the city and state
are to be read as a single value, including the comma but excluding the
quotes. Quotes should also be used if spaces are to be included at the
beginning or end of a value; otherwise, MailMerge discards any spaces before
or after each data item in the data file. If desired, quotes may be used
around all data items.

A data file may be entered (created or updated) with WordStar, or by using
MicroPro's screen-oriented data entry program, DataStar. DataStar is recom-
mended for high-volume data entry and maintainence, as it provides advantages
in speed, data checking, and ease of on-screen review and alteration of data;
WordStar is sufficient to get started and for moderate-volume work.

Using WordStar to Enter a Data File

To enter a data file using WordStar, use the Non-document edit (N) command.
The N command defaults word wrap off, which will prevent accidental entry of
unwanted (soft) spaces and carriage returns into the data file. After pres-
sing N at the no-file menu, enter the desired file name in the usual manner,
and press RETURN. The file name must match that in the .DF command in the
letter file. Then type the desired data with a comma after each item and
quotes before and after any items which contain imbedded commas. Press RETURN
after each record (after the last data item to be used in each letter). End
the edit with ^KD as usual.

Some of the lines may be wider than the screen. In these cases, you will see
a "+" at the rightmost column of the screen. These lines will work correctly
with MailMerge. (If you prefer, you may press the RETURN key instead of comma
between long data items to obtain a clearer screen display. Do not use both
comma and RETURN, and do not use RETURN in the middle of a data item.)

Do not use paragraph reform (^B) on a data file, nor allow word wrap to occur,
as the soft carriage returns these functions insert will be interpreted the
same as hard carriage returns when MailMerge reads the data file.

If you wish to omit an item (perhaps a zip code that you don't know) or leave
a value blank, enter the comma that goes after the value anyway, to make sure
that the other values are read correctly. Otherwise, MailMerge will read the
next item on the line into the variable you intended to omit.

Check the data file over visually to make sure that each value has been
entered correctly, and that each line contains the correct number of values
and commas. Later, we will describe how to check a data file by using
MailMerge with a short document that contains an insertion of (reference to)
each variable.

Reading Variables from a Data File

Two of MailMerge's dot commands must be used in a form letter (or other document) when the variable information to be inserted is to be obtained from a data file:

> .DF   specifies the name of the data file

> .RV   specifiesthe names of variables and order of values

The presence of both of these commands in the letter causes MailMerge to process the letter repeatedly until all of the data is used up. For each set of values (record) in the data file, MailMerge will process the letter document file again, starting at the beginning of the file, interpreting all dot commands and printing all text in the usual manner. Thus, if there are 200 sets of names and addresses in ADDRESS1.DAT, using MailMerge with our example will print 200 letters.

More detailed descriptions of these dot commands follow.

Specify Data File (.DF filename)

The .DF command specifies a file to be used to obtain variable values by subsequent .RV command(s). If the file is not found, a message is displayed.

The presence of .DF (and .RV) causes the document to be processed repeatedly until all data in the specified data file has been used. (The .DF is ignored when encountered during repeat processing, provided that it specifies the file already in use and the data has not already been exhausted.)

Only one data file may be in use (at a time); a document should (normally) only contain one .DF command.

The word CHANGE may be entered after the file name to cause MailMerge to ask the operator to insert a different diskette before execution of the command, as will be detailed later. Examples:

> .DF ADDRESS1.DAT

Take values for variables named in subsequent .RV commands from file ADDRESS1.DAT on the logged disk drive. Print document containing the .DF command repeatedly until a copy has been printed for each set of values in the data file.

> .DF B:DATA3.DTA CHANGE

Ask operator to change diskette in drive B. Take data from file DATA3.DTA on drive B. Print document repeatedly until data used up.

Read Values (.RV variable1, variable2, variable3, ...)

The .RV command causes values for indicated variable or variables to be read from the data file named in a preceding .DF command.

The order of variable names in the .RV command must correspond to the order of values in the data file. The first data item in a record (line) in the data file is the value for the variable named first in the .RV command.

The variables may be subsequently used in the document in any order and any number of times apiece.

One .RV is normally used to read all data used in a document; however, multiple .RV's are allowed and are convenient if there are many variables or long variable names are being used.

<div align="center">Caution</div>

> If there are insufficient data items (separated by commas) on a line
> in the data file, .RV will pass a carriage return and go to the next
> data file line in order to obtain values for all variables named in
> the command.

Any unused values remaining on a data file line are discarded when the end of the document is reached; data used in each repeat processing of the document always starts at the beginning of a line. Example:

> .RV COMPANY, ADDR1, ADDR2, ADDR3, NAME

> Read values for the variables COMPANY, ADDR1, ADDR2, ADDR3, and NAME,
> in order, from the data file in use (as specified in preceding .DF
> command). For example, the next data item will be inserted into the
> current copy of the letter (or other document) in place of each
> occurence of &COMPANY&.

Initiating MailMerge

At the no-file menu, enter M for MailMerge. WordStar will ask

> NAME OF FILE TO MAILMERGE? ▊

Enter the name of the document to be printed (EX1.LET for our example), and press RETURN. A series of option questions, similar to those asked by the regular print command (Section 8) will follow. Pressing return will usually suffice for each, except you should answer Y to PAUSE BETWEEN PAGES if you wish to load individual letterhead pages into your printer for each letter.

<div align="center">Note</div>

> The NUMBER OF COPIES option question (which appears in MailMerge
> initiation only) specifies the number of **duplicate** copies. If you
> answer, 3 to this question, 3 copies of each letter will be printed.

While MailMerge is printing, the screen displays

        P=STOP PRINT

which is one-entry "menu" showing that the only command which may be entered
during MailMerge operation is "P", to stop the print. The lower part of the
screen will show any error or warning messages produced by MailMerge, and may
be used for messages to the operator or requests for data entry under the
control of dot commands to be described later. If screen space permits, the
file directory will remain on display if file directory display was left ON at
the no-file menu.

At a print pause (invoked by entry of P, by the PAUSE BETWEEN PAGES option, or
by a ^C in the document), the no-file menu reappears. Press P to resume
printing.

Sample Output

Shown below is the output that results from using MailMerge with the example
letter (EX1.LET) using the example data file (ADDRESS1.DAT), both shown
several pages back. (Three pages of printout are actually produced; we have
shown them on one page merely to save space.)

Since there are three lines in the data file, three letters are printed. Each
letter has data items from the data file inserted in place of the variable
references (&ADDR1&, &ADDR2&, &ADDR3&) in the document file.

Where a variable (&COMPANY&) was used in mid-paragraph, MailMerge reformed the
lines (as though an ^B had been executed in the edit function) in the rest of
the paragraph to adjust for the varying lengths of the company names.

At this point we recommend that you try MailMerge. Enter the letter and data
files shown in this subsection, or think up some examples of your own, and see
it work. Try it—you'll like it!

                              June 16, 1980

        NORCAL Computers
        1600 Highland Avenue
        Alameda, California
        94501

        Dear Mr. Smith,

        We would like to announce the availability of WordStar
        2.0 together with the MailMerge option. We believe
        many of the customers of NORCAL Computers will like the
        enhanced capabilities provided by the MailMerge option,
        including the ability to make attractively-formatted
        insertions in mid-paragraph in form letters.

                              Sincerely,

                              Chip Pood
                              Director of Marketing

June 16, 1980

TRIAD
1829 Santa Clara Road
Malad City, Idaho
83251

Dear John,

We would like to announce the availability of WordStar
2.0 together with the MailMerge option. We believe
many of the customers of TRIAD will like the enhanced
capabilities provided by the MailMerge option,
including the ability to make attractively-formatted
insertions in mid-paragraph in form letters.

                         Sincerely,

                         Chip Pood
                         Director of Marketing

June 16, 1980

Wolcott Associates
16 Rue Diesal
Casteau, Belgium
APO 09055

Dear Mr. Baudoin,

We would like to announce the availability of WordStar
2.0 together with the MailMerge option. We believe
many of the customers of Wolcott Associates will like
the enhanced capabilities provided by the MailMerge
option, including the ability to make attractively-
formatted insertions in mid-paragraph in form letters.

                         Sincerely,

                         Chip Pood
                         Director of Marketing

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**Section 10
The MailMerge Option:
Operator Input**

OPERATOR DATA ENTRY

Section 9 showed how to produce form letters using data from a data file
recorded on a diskette. In some cases where only a few letters are to be
produced at a time, and where it is not desirable to record the data on a
diskette for possible future use, it may be more convenient to skip the step
of preparing a data file, and instead key the data in as each letter is being
printed.

This section assumes you have read Section 9; familiarity with information
presented there, particularly about variables, will be assumed.

Suppose you wish to send letters acknowledging orders received. Each one of
these letters may be the same except for the name and address, the number of
units ordered, and the ship date. While you may send many of these letters in
a month, they are to be printed individually on the day each order is re-
ceived. A typical letter might appear as follows:

June 16, 1980

NORCAL Computers
1600 Highland Avenue
Alemeda, California
94501

Dear Mr. Smith,

We have received your order for three (3) WordStars
together with your payment. Your order will be shipped
on June 25, 1980.

Thank you,

Jane Janesfield
Director of Order Processing

To produce these letters with keyed-in data, you might prepare a document as
follows on a file named EX2.LET:

```
         .. file EX2.LET
         .OP
         .AV DATE-TODAY
         .AV COMPANY
         .AV ADDR1
         .AV ADDR2
         .AV ADDR3
         .AV NAME
         .AV QUANTITY
         .AV SHIP-DATE
```

                              &DATE-TODAY&, 1980

         &COMPANY&
         &ADDR1&
         &ADDR2&
         &ADDR3&

         Dear &NAME&,

         We have received your order for &QUANTITY& WordStars
         together with your payment. Your order will be shipped
         on &SHIP-DATE&, 1980.

                              Thank you,

                              Jane Janesfield
                              Director of Order Processing
         .PA

You can see that this file is similar in structure to the example used in the
preceding subsection; the difference is that the .DF and .RV dot commands have
been replaced with a number of .AV dot commands, one .AV for each variable.
The year in each date was made part of the text, since it is easier to change
the document once a year than to type the year each time a letter is printed.

The .AV dot command (Ask for Variable) asks the operator for the data value
for the indicated variable. For example, when MailMerge encounters

         .AV COMPANY

the following prompt will appear on the screen

         COMPANY? ▮

The operator may key in the company name for the letter being printed, then
press RETURN. Wherever &COMPANY& appears in the letter, the text entered by
the operator will print instead. While keying in the data, the operator may
use the usual WordStar control characters to make corrections—^S to back up
one character, ^Y to erase the entire answer, and others as described in
Section 3. However, once you have pressed RETURN, you can't modify your entry
any further.

To use MailMerge with the example, enter M at the no-file menu, key in the
file name rX2.LET, and press RETURN. WordStar will then ask for the variable
data as specified by the .AV commands in the document. The screen will
display the following as you are about to press RETURN for the last variable
(operator typing underlined):

                DATE-TODAY? June 21
                COMPANY? Neighborhood Computer Center
                ADDR1? 123 Forty-Fifth Street
                ADDR2? Smalltown, New York
                ADDR3? 01999
                NAME? Customer
                QUANTITY? twenty-seven (27)
                SHIP-DATE? July 10 ∎

After the last data item is entered, the letter will print, as follows:

                        June 21, 1980

        Neighborhood Computer Center
        123 Forty-Fifth Street
        Smalltown, New York
        01999

        Dear Customer,

        We have received your order for twenty-seven (27)
        WordStars together with your payment. Your order will
        be shipped on July 10, 1980.

                        Thank you,

                        Jane Janesfield
                        Director of Order Processing

Making the Letter Repeat

The above document prints a single letter each time it is used with MailMerge.
To print another letter, it is necessary to enter the M command again at the
no-file menu. If you wish to print several letters at a time, it is more con-
venient to have the letter repeat until stopped.

One way to invoke such repetition would be to enter a large number at the
NUMBER OF COPIES? question, then terminate printing with the P command when
all of your letters had been printed.

Another way, not requiring special operator action each time letters are to be
printed, is to place

        .FI EX2.LET   (or whatever the file name is)

at the end of the document file. This will cause the processing of the file
to start over at the beginning each time the end is reached. (This is one of

many uses of the "File Insert" dot command; other uses are described later.)
To cause a file to be repeatedly processed until stopped by the operator,
place the dot command .FI filename at the end of the file, where "filename" is
the file's own name.

With either of the above methods, MailMerge will ask for the data for one
letter, print that letter, then start asking for the data items for the next
letter.

For convenience, when a particular data item is the same as in the previous
letter, entering ^R (control-R) will restore the previous value. Press RETURN
to use this value; the value may be edited if desired by moving the cursor
left with ^S, right with ^D, and retyping characters as desired. For example,
if the ship date is the same as in the preceding letter, press ^R and RETURN
when the prompt SHIP-DATE? appears. For the DATE-TODAY, this technique is
particularly pertinent; later we will describe how to ask once for the date to
be used in all letters.

Printing under either repetition method may be terminated by entering the P
command when MailMerge is **not** asking for data. The P will not be effective if
entered at a prompt for a data value; MailMerge will think the P is data.
Hence, we suggest that you wait until the last desired letter has completely
printed and the next data prompt (DATE? in our example) has appeared on the
screen, then press RETURN and P in rapid succession. The P will be received
before the next data prompt appears, and will be taken as a "stop print"
command. The prompt

   TYPE Y TO ABANDON PRINT, N TO RESUME, ^U TO HOLD: ▉

will appear on the screen; press Y.

In the above example, each data prompt produced by a .AV command appears below
the preceding prompt; when the bottom of the screen is reached, the data entry
area of the screen is scrolled up to make room for the next prompt. For a
clearer display (and faster operation on terminals without a "line delete"
function), place the command:

      .CS

before the first .AV. This command erases the data entry area of the screen,
and starts over at the top of the area. Placing it at the beginning of the
letter will cause the prompts from the preceding letter to be cleared before
the first prompt for the new letter appears.

The .AV command has two additional optional features you may wish to use.
First, the prompt text to be displayed on the screen may be specified. This
allows you to use any text, not necessarily the variable name, to request data
entry. For example,

   .AV "Enter address line 2 as city, state: ", ADDR2

will cause the prompt to appear on the screen as follows:

   Enter address line 2 as city, state: ▉

Second, the number of characters the operator may enter may be restricted. This may be used as a data check, or to limit the data length to fit a particular format. If the operator enters too many keystrokes, the excess characters will not be accepted and will not appear on the screen. For example,

> .AV ZIP, 5

will accept only five characters.

Ask for Variable (.AV ["prompt"], variable, [max-len])

The .AV command asks the operator to enter the data for a variable. The brackets above enclose optional items. The elements of the command are:

"prompt"   Text to display to request variable. Must be enclosed in quotes; either single quotes (') or double quotes (") may be used. If omitted, variable name, question mark, and a space are used.

variable   Name of variable being requested. Enclose this name in &'s at points in the following text where data entered is to be inserted. Do not use &'s in the .AV command.

max-len   Maximum number of characters to accept.

The usual control characters (^S=erase character, ^Y=erase entire answer, ^R=use present value of variable; see Table 1.3 for others) may be used to edit the text being entered. Press ^N to enter a carriage return INTO THE DATA. Press RETURN to terminate entry.

The maximum number of characters which may be entered is limited to the portion of the screen width remaining after the prompt is displayed, or to the max-len parameter if specified and smaller.

If a .AV is being executed (if a data entry prompt is displayed), and you wish to stop print, press RETURN and P in rapid succession.

> Examples:
>
> .AV NAME
>
> .AV "enter name in the form LAST, FIRST: ", NAME
>
> .AV 'City, State? ', ADDR2, 30
>
> .AV ZIPCODE, 5

Finally, here is a sample letter, similar to that shown at the beginning of this subsection, but with a number of additional dot commands added. Can you identify the function of each command?

```
.. file EX2A.LET
.OP       Turn off page-numbering
.CS       Clear the screen
.AV "        Today's date? ", DATE-TODAY
.AV "        Company name? ", COMPANY
.AV "      Street Address? ", ADDR1
.AV "          City, State? ", ADDR2
.AV "Zip or other 3rd line? ", ADDR3
.AV '   Name or "Customer"? ', NAME
.AV "Quantity as words (number)? ", QUANTITY
.AV "              Shipping Date? ", SHIP-DATE
```

                              &DATE-TODAY&, 1980

&COMPANY&
&ADDR1&
&ADDR2&
&ADDR3&

Dear &NAME&,

We have received your order for &QUANTITY& WordStars together with your payment. Your order will be shipped on &SHIP-DATE&, 1980.

                         Thank you,

                         Jane Janesfield
                         Director of Order Processing
```
.PA
.FI EX2A.LET
```


DOCUMENTS FOR MAILMERGE

Previous subsections introduced a number of MailMerge features through form letter applications. This section will introduce additional features and other applications.

Document to Process Repeatedly

While all of the preceding examples have printed one-page letters, the document to be processed repeatedly (under the control of .DF and .RV, or by other methods) may print several pages, or only a few lines. For example, each processing of the document file might print one address label only.

When MailMerge starts processing a document again at the beginning, it does **not** do any of the following automatically:

● Start a new page

- Set page number to 1

- Set the page format parameters (paper length, top margin, character width, etc) which can be changed with dot commands (Section 7) back to their original values.

If your document changes any of these items, and the value at the end of the document is not correct for the beginning of the next repetition of the document, then you must include commands at the end or the beginning of the document to reset the effected quantity.

As we noted above, a letter or any document intended to print a full page or an integral number of pages, and to be printed repeatedly with MailMerge, should end with a .PA, and should have a .PN 1 at the beginning if page number printing is not suppressed with .OP.

The lack of automatic paging and re-initialization when the document is re-processed for the next set of data provides flexibility, as will be shown in the examples which follow.

Formatted Printing of a Data File

A formatted printout of a data file gives you an easy-to-read record of your data, and an opportunity to check newly entered data before printing form letters. To make a formatted printout of a data file, create a document like a form letter but with no text other than one insertion of each variable, and no .PA. For example, to print the data file ADDRESS1.DAT shown in Section 9, you might use the following:

```
..ADDRESS1.FMT:  file to print ADDRESS1.DAT
.DF ADDRESS1.DAT
.RV COMPANY, ADDR1, ADDR2, ADDR3, NAME
.CP 6

    &COMPANY&
    &ADDR1&
    &ADDR2&
    &ADDR3&
    &NAME&
```

The .CP 6 command causes a new page to be started if less than 6 lines remain on the current page, so a data record will not be split between pages. Using MailMerge with the above will print out the data in the form:

```
        NORCAL Computers
        1500 Highland Avenue
        Alameda, California
        94501
        Mr. Smith

        TRIAD
        1829 Santa Clara Road
        Malad City, Idaho
        83251
        John
```

Several records will be printed on each page; page numbering and top and bottom margins will occur as usual. Errors such as a missing comma or a mispelled name are easier to detect in a formatted printout than if the data file were printed directly. We suggest you always print and check newly entered data in this manner, in order to reduce the necessity to reprint form letters due to data errors.

Mailing Labels

Mailing labels may be printed by a method similar to the above. The file must be laid out to match the format of the mailing label forms used; usually it is necessary to suppress the top margin (.MT 0; Section 7) and the bottom margin (.MB 0) for continuous forms labels. Also, of course, you will want to print only the address -- for the example file ADDRESS1.DAT, the NAME variable would be omitted.

To print ADDRESS1.DAT on (a hypothetical type of) continuous forms labels, you might use the document:

```
..ADDRESS1.LBL
.MT 0
.MB 0
.DF ADDRESS1.DAT
.RV COMPANY, ADDR1, ADDR2, ADDR3, NAME


        &COMPANY&
        &ADDR1&
        &ADDR2&
        &ADDR3&


.. file ends here
```

Note that the variable NAME is not used. It is not necessary to use all variables present in the data file. The number of blank lines before and after the variable insertions, and the number of spaces to the left of each variable, must be adjusted to position the printout on your forms as desired.

To print labels of any dimension in multi-column format, you must create a document that causes WordStar to apply microspace justification while it justifies the left edge of each name and address. In order to have your label information microspaced and justified, use the following technique.

To print three-column mailing labels, for example, you might create a document
like this (setting tabs to coincide with left edges of second and third
columns of labels):

```
..ADDRESS1.LBL
.MT 0
.MB 0
.DF ADDRESS1.DAT
.RV NAME1, COMPANY1, ADDR1, ADDR4
.RV NAME2, COMPANY2, ADDR2, ADDR5
.RV NAME3, COMPANY3, ADDR3, ADDR6


&NAME1& ^P<RETURN>
<TAB>                   &NAME2& ^P<RETURN>
<TAB>                   <TAB>                   &NAME3& <RETURN>
&COMPANY1& ^P<RETURN>
<TAB>                   &COMPANY2& ^P<RETURN>
<TAB>                   <TAB>                   &COMPANY3& <RETURN>
&ADDR1& ^P<RETURN>
<TAB>                   &ADDR2& ^P<RETURN>
<TAB>                   <TAB>                   &ADDR3& <RETURN>
&ADDR4& ^P<RETURN>
<TAB>                   &ADDR5& ^P<RETURN>
<TAB>                   <TAB>                   &ADDR6& <RETURN>
```

Using ^P followed by RETURN in the text causes a carriage return without a
line feed, so that the line is overprinted by the next line. Consequently,
the file does not print as it appears on the screen.

Press TAB on the second line to place the next variable in the second column.
When the file is printed out, line two will print over line one, skipping over
the entry in the first column because of the TAB. The third line you type
starts with two TABS, which places the variable in the third column. The third
line ends with a carriage return only (the ^P is omitted), so that the fourth
line does not overprint the third, and actually becomes the second line of the
printout. This process is repeated for the remaining variables, so that they
line up in three columns.

When MailMerge reaches the end of the third line in the data file, it will
assign the variable names in the first .RV line to the fourth line in the data
file, and so on.

To adjust spacing for the size of the labels you're using, you will have to
experiment with line height (.LH) or page length (.PL), and top and bottom
margin settings (.MB and .MT).

With the same techniques, you can set up a document to print any number of
columns of labels. If you had four columns, you would need four .RV lines;
five columns would require five .RV lines, and so forth.

Envelopes

To print directly on envelopes from the data file, create a document file
formatted to print the address in the desired position. It is necessary to
stop print for each envelope to be loaded; this may be accomplished by
printing one "page" for each envelope and answering Y to PAUSE BETWEEN PAGES?
when initiating MailMerge, or by putting the "pause" print control (^C) in the
file. The following example assumes the return address is pre-printed on the
envelope. Note that the NAME variable is used to add an "attention" item.

```
..ADDRESS1.ENV   print envelopes from ADDRESS1.DAT
.PL 40    "page" length in lines
.MT 0
.MB 0
.DF ADDRESS1.DAT
.RV COMPANY, ADDR1, ADDR2, ADDR3, NAME
..  ^C on next line stops to await envelope insertion
^C




                              &COMPANY&
                              &ADDR1&
                              &ADDR2&
                              &ADDR3&

                              attention: &NAME&

    .PA   end "page" / roll envelope out of printer
```

Each time the control-C is encountered, print pauses (and the no-file menu
appears). The operator loads the next envelope, then presses P to continue
print. The number of blank lines above the address in the document, and the
position to which the operator rolls the envelope into the printer, must be
coordinated to achieve the desired positioning of the address. The page
length set with the .PL at the beginning determines how far the carriage rolls
after printing the address; we suggest setting it so the envelope ejects
completely.

**OMITTING A LINE IF
THE DATA IS NULL**

Occasions arise where you want to allow for a data item which is usually
absent, and where you want the line in which the data would be inserted to be
omitted (rather than a blank line printed) when there is no data.

To handle these situations, enter zero length data (just enter the following comma in a data file; just press RETURN when prompted for data on the screen), and reference the variable in the form &NAME/O& where you wish the data inserted.   The "/O" between the variable name and the following & cause MailMerge to omit the **entire line** if the data has a length of zero characters and the line in the document is otherwise blank.

For example, consider addresses. Up to here, we have shown all examples with three lines of address. However, to handle all possibilities, such as foreign addresses, suite or room numbers, name of recipient as well as name of company, as many as five or six lines may occasionally be needed. However, for the typical three-line address, you may not wish to print three additional blank lines after the address at the beginning of each letter.

You could begin a letter thus:

```
.OP
.DF ADDRESS.DAT
.RV COMPANY, ADDR1, ADDR2, ADDR3, ADDR4, ADDR5, NAME

                     June 16, 1980

&COMPANY&
&ADDR1/O&
&ADDR2/O&
&ADDR3/O&
&ADDR4/O&
&ADDR5/O&

Dear &NAME&,
   ...
```

In the above letter, only those address lines for which non-null data was present would print; the remaining address lines would be omitted. (If the /O's were not present, blank lines would print).

The data file for use with the above letter must be prepared with five address items, and **a comma must always be entered** for each item for which there is no data. (If the comma is omitted, MailMerge will read the next field, NAME, into the address, then read into the next line of the data file to obtain a value for NAME, resulting in a mess.)

A few lines out of a data file for the above letter might look like:

```
NORCAL Computers,1500 Highland Avenue,"Alameda, California",,,94501, Mr. Smith
Worldwide Inc.,Dept. M,Suite 400,1001 5th Ave,"New York NY",10099,Miss Doe
Jones Grocery, "Pioneer, California", , , , 99999, Mrs. Jones
```

Note that although the number of address items varies, every line in the data file contains seven items or places for items, delimited with six commas (not counting the commas inside the quotes). Some lines contain spaces after the commas; some do not; these spaces are not significant. The order of the items matches the .RV command in the letter. As shown, the zip code is always in the last address item (the sixth field in the record). This is for convenience in sorting and selecting with other programs; the uniform positioning is not needed to print the letter shown above.

/O in a variable reference causes the line to be omitted only if the variable is defined, has a length of zero characters, and the line in the document contains nothing else except spaces and possibly other /O references to other defined, null (zero length data) variables. If there is a non-blank character in the document line, or another reference to a variable which is not defined as null, the line will print. If the variable value contains any characters at all, including a space, the line will print.

When entering data, a data item can be made blank yet not null by giving it a value consisting of one (or more) spaces. This will force a line containing a /O reference to it to print (as a blank line), rather than be omitted. Enter " " (a space enclosed in quotes) in a data file, or press the space bar before pressing RETURN when entering data in response to a .AV dot command.

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Section 11
The MailMerge Option:
Multiple Tasks

</div>

SETTING VARIABLES WITHIN THE DOCUMENT

Sometimes you will have a piece of data which you want to be able to change easily with the edit function, but which stays the same throughout a MailMerge operation. For such information, you may use a variable. The text to be inserted at each use of the variable is set with the .SV dot command; the variable name enclosed in &'s is used as usual at subsequent points where the variable value is to be inserted in the text.

For example, in any of the preceding form letter examples, you could use

.SV DATE, June 27, 1980

near the beginning of the document, and &DATE& where the date was to appear. This makes it unnecessary to enter the date (which probably remains the same for a large number of letters) from the terminal. This also makes it unnecessary to include it in a data file, yet makes it especially easy to change by editing the document. If it is at the beginning (the .SV may be placed before all the other dot commands), there is less possibility of inadvertently altering the format of the letter while editing the date line.

Use of .SV is particularly pertinent when a piece of data appears several times in the document, because only one edit (altering the .SV line) will change all occurrences.

Example of Setting Variables

For example, suppose you are a lawyer (or a lawyer's secretary) preparing a contract of a particular type between John Doe and John Smith. The names of the parties, John Doe and John Smith, appear several places in the contract. You are only preparing one such contract at present, but you expect that you may wish to prepare additional similar contracts between other parties in the future. You expect to print out several drafts, so you don't want to have to enter the names of the parties from the keyboard at each printing. Place

.SV PARTY1, John Doe
.SV PARTY2, John Smith

at the beginning of the contract, then use &PARTY1& and &PARTY2& as required throughout the text. When you later wish to prepare another similar contract, edit the .SV's.

Use of .SV in single-copy documents becomes especially useful when paragraphs of standard text are read in from separate files during MailMerge, using the file insertion facility (.FI command) as described later. Use variable references in the standard paragraphs for any items which may vary from document to document, and use .SV's (be sure the variable names match correctly!) in the invoking document to establish the texts to be inserted.

Set Variable (.SV name, value)

The .SV command sets the text to be inserted for the named variable at subsequent references.

After the variable name, one comma, then one space, if present, are passed up; the entire rest of the document line (up to the variable length limit of 200 characters), including any leading and trailing blanks, becomes the value of the variable.

To put a carriage return into the variable value, use a control-N in the .SV command.   (To enter a control-N into the file, type control-PN.)

Do not use &'s around the name (unless you really wish insertion to occur before the dot command is executed).

Variable references may be used in the .SV command; the insertion will occur when the command is encountered.

> Examples:
>
> > .SV DATE, June 27, 1980
> >
> > .SV PARTY1, John Doe
> >
> > .SV ADDRESS, 123 45th Street^NNew York, New York, 10099
> >
> > .SV PARTIES, &PARTY1& and &PARTY2&

SCREEN DISPLAY

A dot command (.DM) may be imbedded in the document file to display messages to the operator during MailMerge. Each message appears on the next lower screen line; the screen scrolls up when full. Another dot command (.CS) will clear the display area of the screen and restart at the top, optionally displaying a message at the same time. Additional examples will be given after the following dot command descriptions.

Display Message (.DM [message])

The .DM command displays a message on the screen for the operator to read. The message is all text after the characters ".DM " (excluding the space after the M, if a space is present) to the end of the document line.

If no message is given, .DM leaves a blank line on the screen.

Each message appears below preceding messages, scrolling the screen up if the screen is full.

Variables may be inserted into the message (using the usual &NAME& form of reference), so that data can be displayed to the operator.

Examples:

    .DM   (leave blank line)

    .DM This file prints order confirmation letter

    .DM now printing chapter 7

    .DM printing letter to &NAME&

    .DM load envelope in printer, press P

    .DM insert "receivables data" diskette in drive B

Clear Screen, [display message] (.CS [message])

The .CS command clears the MailMerge operator display area of screen and causes next .DM message, .AV prompt, or error message to appear on the top line of the display area. The brackets indicate that the message is optional.

If a message is given, it is then displayed, on the top line of the display area. The .DM description above applies also to the display of messages with .CS.

Examples of .CS:

    .CS   (just clear MailMerge display area)

    .CS Press RETURN, P to stop, or Enter data for next letter

For example, the following could be used to display the name and address of the recipient of the letter being processed. This allows the operator to check the data as it is used, more easily than by watching the printer. Also, the printer runs several lines behind MailMerge's processing. Displaying the data is especially pertinent if DISK FILE OUTPUT is in use.

```
.. file EX1D.LET: example 1 with display added
.OP
.DF ADDRESS1.DAT
.RV COMPANY, ADDR1, ADDR2, ADDR3, NAME
.. next command clears display from previous letter off of screen
.CS
.. following commands display data just read
.DM &COMPANY&
.DM &ADDR1&
.DM &ADDR2&
.DM &ADDR3&
.DM &NAME&

(text continues here)
...
```

The above example shows one use of MailMerge's powerful ability to insert data into dot commands as well as into text.

FILE INSERTION

MailMerge's file insertion facility has numerous uses, including reading
standard "boiler plate" texts from other files at print-time, using a file
containing commands only to invoke the printing of several other files, doing
initial processing (such as asking the operator for today's date) before
repeatedly processing a file to print form letters, and structuring complex
printing tasks to be performed with a single operator invocation of MailMerge.

The .FI Dot Command

The file insert dot command,

        .FI filename

inserts a named file into the file now being processed. The inserted file is
processed as though all commands and text in that file appeared in place of
the .FI command, then processing of the file containing the .FI resumes with
the line after the .FI command. (The insertion occurs only in the processing
and printing done by MailMerge; the document file containing the .FI command
is of course left unchanged.)

"Boiler Plate" Text

Commonly used paragraphs (or sentences or pages) of text can be entered onto
separate files. Whenever one of these paragraphs is desired in another docu-
ment, a .FI with the appropriate file name may be placed in that document, and
MailMerge will perform the insertion at print time. Variables set in the
invoking document (the document containing the .FI) will be appropriately
inserted at any references in the inserted file, provided of course corres-
ponding variable names are used. This facility saves diskette space and
shortens documents. This method of handling "boiler plate" is especially
pertinent if you want to be able to update a standard paragraph and have all
documents using it change: just edit the file containing the paragraph, and
all documents invoking that paragraph from that file will reflect the change
when next printed.

For example, you might use the following document file to print one of several
form letters used in responding to inquiries:

```
..MRGPRNT3.TXT
.FI HEADING.TXT

.FI PARAG1.TXT
```

The products described in the above paragraphs may be ordered
through your dealer, or direct from MicroPro International
Corporation.

```
.FI ORDRINFO.TXT
```

Thank you very much for your inquiry. If I may be of further
assistance, please do not hesitate to call or write.

                    Sincerely,

                    Chip Pood
                    Director of Marketing

The above would process the file HEADING.TXT (which might ask for, then print
the recipient's name and address), then print a blank line, then process
(execute commands and print text in) PARAG1.TXT, then print another blank line
and the text shown (The products described ...), then ORDRINFO.TXT, then the
rest of the text shown.

The file ORDRINFO.TXT might be invoked with .FI from numerous form letters.
Whenever the ordering information changed, ORDRINFO.TXT could be edited and
the change would be reflected in all the form letters.

When preparing standard "boiler plate" paragraphs on separate files to be
inserted into documents at print time via .FI, be sure the boiler plate file
ends with a carriage return: examine the editor screen when creating or
changing the file, and make sure the "<" appears in the rightmost column after
the last line of the file. **MailMerge will not automatically supply a missing
carriage return.** If the carriage returns were missing in the above example,
the intended blank lines would not print. If there were no blank lines after
the .FI command, the last line of the boiler plate paragraph and the next line
of the invoking document would be printed as a single long line, which gene-
rally isn't desirable.

Note

Advanced users might use boiler plate files not ending in carriage
returns to concatenate SENTENCES from separate files into a para-
graph. Use a SOFT carriage return before the .FI to prevent the
carriage return after text preceding the .FI from printing, and use
the .PF ON and .RM n commands described later to force MailMerge to
format the paragraph as desired.)

Command Files

We will use the term command files for a "document" file that contains only
(or mostly) dot commands, rather than text. A command file is not actually a
separate file type, just a file into which you have entered mostly commands to
direct printing operations, rather than text to be printed. Using the .FI

command, command files can be created for a number of useful purposes, including printing multiple files with one operator invocation of MailMerge, performing "initial processing" (such as asking the operator only once for today's date) before repeatedly processing a file to print form letters, and performing several printing tasks in sequence with only one operator invocation.

Printing Multiple Files

If you are creating a large document, such as a book, it is convenient to maintain the text as multiple files, for example, one file for each chapter or section.   Multiple short files facilitate editing, and printing sections for proofing during revisions, and allow the whole book to grow larger than the capacity of a diskette.   When a printout of the entire book was desired, the operator could use MailMerge with a command file which "inserts" each chapter or section in sequence.   If the individual sections were on files named CHAPTER1 through CHAPTER4, the command file might be as follows:

```
.FI CHAPTER1

.FI CHAPTER2

.FI CHAPTER3

.FI CHAPTER4          .
```

The above file, when used with MailMerge, will cause CHAPTER1 through CHAPTER4 to be printed in sequence.   The blank lines between the .FI's cause the next dot command to operate correctly even if the final carriage return is omitted at the end of one of the CHAPTER files; they will of course insert blank lines in the printout in the normal case.   You might also want to put other commands, such as a .PA before each .FI, in the command file.

If the book grew to the point where the chapters had to be on multiple diskettes, the disk change option of the .FI command could be used.   Place the following command file on drive A (also place the files required by WordStar, such as WSOVLY1.OVR and WSMSGS.OVR, on drive A), and insert the disks with the CHAPTER files in drive B as required:

```
.FI B:CHAPTER1   CHANGE

.FI B:CHAPTER2   CHANGE

.FI B:CHAPTER3   CHANGE

.FI B:CHAPTER4   CHANGE
```

With the word "change" after the filename, MailMerge will ask the operator to insert the new diskette into the indicated drive, then press RETURN, before starting to process the new file.

Repeated Processing of an Inserted File

If the file inserted with .FI contains .DF and .RV commands (or the .RP command, described later), then the INSERTED FILE will be processed repeatedly until the data is used up.   The file containing the .FI is not included in the

repetition; processing continues in the file containing the .FI only when the inserted file has been processed repeatedly until all the data has been read. As an example, consider the command file:

```
.FI EX1.LET
.FI LETTER2.LET
```

where file EX1.LET is the product announcement letter example from Section 9, and LETTER2.LET is some other document. When the above command file is used with MailMerge it first invokes EX1.LET. EX1.LET, as shown in Section 9, will access the data file ADDRESS1.DAT and print copies of the product announcement letter for each name and address in the data file. After all those letters have been printed, processing of the above command file will resume at the next line -- .FI LETTER2.LET.

File LETTER2.LET will then be invoked. That file might or might not be another document that uses a data file to print multiple letters; if it uses a data file, it could be the same data file (ADDRESS1.DAT) or a different data file, as specified in a .DF command.

Thus it can be seen that an inserted file may be processed repeatedly (printing multiple copies), while the invoking file (usually a command file) is processed only once. This capability may be used to advantage to perform initial processing, such as asking for certain data only once, or printing a header, and to perform once-only processing at other points in the printing job.

Initial Processing

The general form for doing certain processing only once before printing a letter (etc.) repeatedly is:

1. Create a command file that does the initial processing, then calls the form letter which is to be processed repeatedly (using .FI).

2. Make sure the commands which invoke repetition (.DF/.RV, or the .RP command described below) are in the form letter file, as opposed to in the command file.

3. Use MailMerge with the command file.

Asking for Data Only Once

To allow the operator to enter data, such as today's date, or the name of the sender of a letter, create a command file that uses .AV to ask for the desired variables, then invokes the form letter or other file that prints multiple copies. In the form letter, use the same variable names used in the .AV's in the command file. To initiate printing, use MailMerge with the command file.

An example of a general command file to **ask for today's date only once** and then print form letters is:

```
.AV "Enter today's date: ", DATE
.FI letterfile
```

where **letterfile** repesents the name of some file which prints form letters and uses &DATE& where today's date is to print. Putting the .AV for DATE in the command file, not in the file with the letter, causes MailMerge to ask for the date once, then use the date entered in all letters printed. With this method, it isn't necessary to edit the letter file every day to get the correct date into it, nor is it necessary to key in the date for each letter printed.

Let's apply this same principle to the example used in Section 10. Create the command file:

```
.CS  **** Print Order-Acknowledgement Letters ****
.AV "Enter today's date: ", DATE-TODAY
.AV "Enter ship date for this group of letters: ", SHIP-DATE
.FI EX2B.LET
```

Then create a file EX2B.LET which is the same as EX2.LET (or EX2A.LET) as shown in Section 10, except without .AV's for DATE-TODAY and SHIP-DATE. When the above command file is used with MailMerge, WordStar will ask once for the date to show at the top of the letters, and the shipping date to be inserted in the letters, then repeatedly ask for the other information for each letter, and print the letter.

Getting the Data File Name from the Operator

n the examples that use data files we have shown so far, the name of the data file is incorporated in the .DF command in the letter document file. However, you may want to print a given letter with various data files at different times. This could be accomplished by editing the letter file to change the data file name for each print run, but it would be more convenient to be able to enter the data file name from the console after invocation of MailMerge. By using MailMerge's ability to insert variable data into dot commands, this can be achieved.

Prepare a command file called LETTERS containing the following:

```
.. file LETTERS
.DM  Print Form Letters
.AV "Enter file name of letter to print: ", LETFILE
.AV "      Enter file name of data file: ", DATAFILE
.FI &LETFILE&
..
```

Document files to be printed via the above command file must contain

```
.DF &DATAFILE&
```

that is, a .DF command to specify the data file whose name the operator entered at the .AV for the variable DATAFILE, as well as a .RV command appropriate to whatever data file(s) are to be used.

When the above command file, LETTERS, is used with MailMerge, WordStar will
ask for the name of the document file containing the letter to be printed,
then ask for the name of the data file to be used in this printing of the
letter, then proceed to print the letters by invoking the letter file whose
name the operator entered (via .FI &LETFILE&). The separate command file is
used for the .AV's to prevent the .AV's from being repeated (and the operator
from having to enter the information again) for each letter printed.

Alternate Method: Using
the Repeat Command (.RP)

In the preceding examples, a command file was used to perform initial proces-
sing, then a document invoked with .FI was processed repeatedly to print
multiple letters or other documents. The reason the file called with the .FI
was processed repeatedly is that the .DF command (for all cases using a data
file) was located in the file called.

An alternative method is available, which permits locating the .DF in the
command file if desired. You might wish to do this so part of the data could
be read in the command file, or to make it unnecessary to have the variable
name for the data file match in the command file and the letter file. The
alternative method is to put

        .RP

in the file which reads the data and prints the letters. .RP (along with a
.RV in the same file) will cause this file to be processed repeatedly until
all the data has been read, even if the .DF is in a different (invoking) file.

For example, consider the command file:

        .DM Print Form Letters with .RP in Letter
        .AV "Enter file name of letter to print: ", LETFILE
        .AV "   Enter file name of data file: ", DATAFILE
        .DF &DATAFILE&
        .FI &LETFILE&
        ..

When the above command file is used with MailMerge, it will ask for a letter
file name and a data file name, execute a .DF command for the specified data
file, then invoke the specified letter file. The letter file whose name the
operator enters should contain a .RP command, and a .RV command appropriate to
the data file specified by the operator.

The specified letter file will be processed repeatedly due to the presence of
the .RP command. (The command file would also be processed until the data is
used up, due to the presence of the .DF, but since the letter uses up the
data, no repetitions result.)

Using a Command File to
Perform Multiple Tasks

Command files of the sort that perform initial processing, as discussed on
preceding pages, may be extended to permit printing multiple files, each
repeated for all records in a data file, with one operator invocation.

For example, the following prints letters using a data file, then prints
envelopes using the same data file.

```
.DM  Print Form Letters, then envelopes
.AV "Enter file name of letter to print: ", LETFILE
.AV "     Enter file name of data file: ", DATAFILE
.FI &LETFILE&
.FI ENVLOPES.DOC
..
```

The letter file name entered by the operator, and the file ENVLOPES.DOC, must
both contain .DF &DATAFILE& and an appropriate .RV. Since the data was used
up by LETFILE, the .DF to the same data file in ENVLOPES.DOC will start over
at the beginning of the data.

File Insert (.FI filename [CHANGE])

The .FI command causes the contents of the named file to be inserted in place
of the .FI command itself.

Processing proceeds as though the contents of the named file were present in
place of the .FI command, except that if repeated processing is invoked in the
inserted file (via .DF/.RV, or via .RP), only the inserted file is repeatedly
processed — the file containing the .FI is not included in the repetition.

After the inserted file has been completely processed (all commands executed
and all text printed, including any repetition invoked by commands in the
file), processing of the invoking file resumes at the line after the .FI
command.

Make sure that files inserted with .FI end with a carriage return, as none is
automatically supplied upon return to the invoking file. This is especially
important if the document repeats due to a .DF and/or .RP command.

A file may contain as many .FI's in sequence as desired.

The inserted file may itself contain .FI's to additional files, and those
files may contain .FI's to further files, to a maximum "nesting level" of 8
.FI's deep. (If the nesting limit is exceeded, the specified file will be
invoked, but processing will return only to the last 8 invoking files.)

When a .FI is the LAST LINE of a file, the .FI does not count in toward the
limit of 8-deep nesting; as many files as desired may be thus "chained" with a
.FI at the end of one file initiating printout of the next file.

The word "CHANGE" may follow the filename to request operator disk change
before execution of the command.

   Examples:

      .FI PARAG1.TXT

      .FI B:ORDERINF.DOC

      .FI B:CHAPTER5   CHANGE

Caution

When a .FI command is the last line of a file, be sure a carriage
return is entered to end the line — i.e. be sure a "<" shows in the
rightmost screen column of the .FI line. If the RETURN is omitted,
repeated processing, if in use, may malfunction. (Most other dot
commands will work correctly at the end of a file even if the final
RETURN is omitted.)

Repeat Until End of Data (.RP)
Repeat n Times   (.RP n)

.RP invokes repeated processing of the file containing the command.

.RP n (where n is a number) causes the file to be processed that many times
(producing that many copies of whatever printout the file produces).

If .RP n causes a file containing a .DF to be processed again after data file
has been entirely read, the data file will be started over from the beginning.

.RP with no number after it causes the current file (the file containing the
.RP) to be processed until all data in the data file has been used. .RP is
effective if a .DF has been executed (in the current file or in one that
invoked the current file with .FI), and there is a .RV in the current file or
a file inserted into the current file with .FI.

.RP with no number is useful when the data file has been opened in a file that
invoked the current file with .FI, to cause the current file, rather than the
file containing the .DF, to be processed repeatedly.

.RP with no number is redundant if there is a .DF and a .RV in the current
file (the file containing the .RP), as the .DF/.RV combination will invoke
repeated processing.

.RP with no number has no effect if no data file is in use, or if no .RV has
been executed when the end of the current file is reached.

Examples:

> .RP 10   Process the current file 10 times. If the current file was
> invoked from another file with .FI, processing of the invoking
> file will resume only after the current file has been repeated
> 10 times.

> .RP   Process the current file until the data file is used up.
> Pertinent only when .DF command is in a file which invoked
> the current file with .FI.

Caution

When a .RP command is the last line of a file, be sure a carriage
return is entered to end the line — i.e. be sure a "<" shows in the
rightmost screen column. If the RETURN is omitted, repeated proces-
sing may fail to occur. Placing .RP near the beginning of the file
is suggested.

Note

.RP 0 prints the document once; it is equivalent to .RP 1.

CHANGING DISKETTES

The .FI (File Insert) and .DF (Data File) dot commands both allow the word
"CHANGE" to follow the file name to direct MailMerge to ask the operator to
change diskettes before accessing the inserted document file or the data file.
When processing such a command, MailMerge will display a message showing the
file name, including the drive name (with the current drive filled in if none
was specified), then wait for the operator to press RETURN to signify that the
diskette has been inserted. If you wish to display additional instructions to
the operator, the .DM and/or .CS dot commands (described above) may be used.

When the operator presses RETURN, MailMerge will look for the file. If the
file is not found, a message will be displayed and the operator will again be
asked to insert the correct diskette.

If the disk change resulted in removing the diskette containing the file con-
taining a .FI command, another disk change prompt will automatically occur at
completion of the inserted file, before continuation of processing of the
invoking file.

When using the disk change option, the drive in which the diskette is to be
changed must NOT contain any of the files always required by WordStar --
WSOVLY1.OVR and WSMSGS.OVR -- nor (for the .DF command) the document file
being printed, nor (for the .FI command) the data file in use, if any, nor the
disk output file, if one is in use. Generally, this is achieved in a two-
drive system by having all of those files on drive A, and changing diskettes
in drive B. Hence, be sure to put "B:" before the file name in the .FI or .DF
command.

If the word CHANGE occurs in a .FI or .DF command, but a file on a drive
containing a required file is specified, MailMerge will display a message
"cannot change diskette in drive b:" then attempt to execute the command with
the diskette(s) now inserted.

When diskette change is NOT specified, or when the diskette change request in
the dot command is not executed because it calls for removal of a diskette
containing a file which must remain on line, MailMerge will look for a file on
drive A and the current drive, if different, as well as on the drive specified
in the dot command. If the file is not found, a message will be displayed and
processing will then proceed without executing the dot command.

Section 12
The MailMerge Option:
Print-Time Operations

PRINT-TIME LINE-FORMING

We will discuss here, first, the automatically-invoked reformatting performed by MailMerge after variable insertions, and, second, the dot commands that permit the advanced user to control print-time reformatting if desired.

Automatic Reformatting

After every (mid-paragraph) variable insertion, MailMerge automatically re-forms the rest of the paragraph. This reforming will result in margin re-alignment if the data inserted is of a different length than the variable name and &'s present in the text when the lines were originally formed in the edit function.

The action is similar to that of the paragraph reform command (^B) in the edit function. The left margin, right margin, line spacing, and justified versus ragged right are determined by inspecting the text in the paragraph before insertion of the variable data. (The margins, etc. set in the editor are not permanently recorded in the document file).

When preparing a document to be used with MailMerge, you should bear in mind that if any variables are used in mid-paragraph, such reforming will occur. Since the inserted data is often longer than the variable reference, the automatic print time reforming may move words at the end of a line down to the next line, and may even make the paragraph one or more lines longer than it was before variable insertion. Thus, the page breaks may not occur at printout exactly as they show on the screen during editing.

To insure attractive pagination of the printout even if the automatic re-forming adds lines to the document, we suggest making more generous use of .CP dot commands (Conditional Page, Section 7) than you might otherwise make.

Another trick may be used to make the text during editing appear more like it will at printout: if the typical text to be inserted for the variable is longer than the variable name, type spaces between the &'s and the variable name. For example, enter "&   ADDRESS3   &" instead of "&ADDRESS3&" if ADDRESS3 is used in mid-paragraph. Insert such spaces only before and after the variable name, not in the middle of the variable name. Note: if word wrap breaks the line at these spaces, MailMerge will still detect the variable correctly.

It is possible that on occasion the automatic line reformer may do something you don't want done to your text. For example, if you have a line ending in a hard carriage return, and a long variable value is inserted into it, MailMerge may word-wrap the line for printout even if you intended it to remain a single very long line. Such situations can be corrected by adding one or more of the dot commands described shortly to override the automatic reforming and suppress reforming or reform to your specifications at print time.

Controlling Print-Time Line-Forming

The advanced user may wish to control the operation of the print-time line-former for any of several reasons, including the following:

- to print with different margins than used for editing, as to permit editing text with lines shorter than the screen width, then printing wider than the screen.

- to force ragged right printout of text justified during editing.

- to completely suppress print-time line-forming, so that the input lines are printed with no changes except for variable insertions.

- to set the desired margins in cases where unusual input produces output other than as desired.

The dot commands that permit control over the print-time line-former will be described after a little background on the nature of the print-time line-former.

The Print-Time Line-Former

The print-time line-former actually consists of two sections, the input scanner and the output formatter. The **input scanner** examines all text being used with MailMerge BEFORE variable insertion, and determines:

The left margin: print column in which text begins

Whether the text appears to be justified or ragged right

The right margin: at soft carriage return, column in which text ends.

The line spacing: number of soft carriage returns between lines

Whether there is a reason to reform this line if not otherwise specified by user: e.g. a variable reference.

The **output formatter** processes all text **after** variables have been inserted. It may pass text through unchanged, or it may form lines anew. The output formatter by default takes its instructions from the input scanner; through the use of dot commands, the user can imbed some or all of the desired instructions to the output formatter in the document.

By default, the output formatter will pass all text through unchanged until a variable insertion (variable reference) is seen, at which point it will form lines, starting with the line containing the variable insertion, and stopping at the next hard carriage return, line feed, or form feed character, or at end of file. This is referred to as **discretionary** line-forming; line-forming can also be set ON or OFF by dot command.

When the output formatter is forming lines (as opposed to passing input text through unchanged), it takes the left margin, right margin, line spacing, and justified versus ragged right from the input text (as determined by the input scanner). However, all of these quantities may, if desired, be specified by

dot command, independently of each other and of whether line-forming ON is specified by dot command.

For precise control of format even with mid-paragraph margin changes, dot commands may be imbedded in mid-paragraph as follows. First, in the edit function, enter the paragraph and form as desired in the document. Place the cursor at the beginning of the line above which a dot command is desired. Press ^N. Enter the desired dot command, presumably one of the commands we are about to describe. The dot command will now have a soft carriage return before it; the hard carriage return after the dot command will not be taken as a paragraph terminator by MailMerge. MailMerge will detect the dot command and apply it at the desired point even if (due to print-time line-forming) it falls in mid-line by the time the output formatter reaches it. If it is desired to reform the paragraph in the edit function, it is necessary to delete the dot command, reform, then re-enter the dot command again.

Dot Commands to Control
Print-Time Line-Forming

All of the following are normally unneeded; example cases where they might be desired were given above and will be elaborated after the dot command descriptions. For all of the following, the default is DIS (discretionary). Note that the first command, .PF, can be used to force print-time line-forming on, and that all of the remaining commands have NO EFFECT except when print-time line-forming is on.

<div align="center">

DIS

Print-Time Line-Forming (.PF OFF)

ON

</div>

.PF DIS (default): Leave print-time line-forming to MailMerge's discretion. MailMerge will start print-time line-forming upon seeing a variable reference, and stop at a hard carriage return.

.PF OFF: Completely suppress print-time line-forming, even if a variable reference is seen in mid-paragraph and inserting the variable changes the line length.

.PF ON: Turn print-time line-forming on and leave on until a .PF OFF or .PF DIS is encountered. Reform all lines, using input left margin, right margin, justification, and line spacing, except as specified by additional dot commands. Normally, this would be used to make the margins or some other characteristic of the output different from the input; one or more of the additional dot commands whose descriptions follow must also be given to specify this formatting change.

Right Margin (.RM DIS)
                 n

.RM DIS (default): Use input right margin as right margin for forming lines at print-time, if line-forming is performed.

.RM n: Use the specified column n (a number between 1 and 240) as the right margin column number for forming lines at print-time, if line-forming is being performed.

.RM has no effect except when print-time line-forming is ON, that is, when a variable reference has been seen in the current paragraph or when a .PF ON command has been issued.

Left Margin (.LM DIS)
                 n

.LM DIS (default): Use the input left margin as the left margin for print-time line-forming.

.LM n: Use column n (a number 1-240) as the left margin when print-time line-forming. Use a specified left margin with great caution if your document contains hanging indents or text left of the left margin. Generally, leaving print-time line-forming off or to MailMerge's discretion (or at least, leaving the left margin to MailMerge's discretion) will follow hanging indents best.

.LM has no effect except when print-time line-forming is ON, that is, when a variable reference has been seen in the current paragraph or when a .PF ON command has been issued.

Line Spacing (.LS DIS)
                     n

.LS DIS (default): Make output line spacing match input line spacing when forming lines at print time.

.LS n: Use line spacing n (a number 1 to 9) when forming lines at print time.

.LS has no effect except when print-time line-forming is ON, that is, when a variable reference has been seen in the current paragraph or when a .PF ON command has been issued.

Output Justification (.OJ DIS ON OFF)

.OJ DIS (default): If forming lines at print time, form justified lines if input appears justified (contains mid-line soft spaces and constant right margin), or form ragged right lines if input appears ragged right (contains no mid-line soft spaces, and right margin has frequent small variations). See .LJ ON/OFF, which can force the interpretation of the input.

.OJ ON: Form justified lines whenever forming lines at print-time.

.OJ OFF: Form ragged right lines whenever forming lines at print-time, regardless of whether input appears ragged right or not.

.OJ has no effect except when print-time line-forming is ON, that is, when a variable reference has been seen in the current paragraph or when a .PF ON command has been issued. If you want to force all output justified or ragged regardless of the input, use .PF ON in addition to .OJ ON/OFF.

Input Justification (.IJ OFF)
ON
DIS

.IJ ON: When forming lines at print-time, interpret input as justified: follow all right margin changes if .RM DIS (the default) is in effect; justify the output if .OJ DIS (the default) is in effect.

.IJ OFF: When forming lines at print-time, interpret the input as ragged right: when right margin varies a few columns, find largest value in vicinity and use this for output line-forming if .RM DIS (the default) is in effect; output ragged right if .OJ DIS (the default) is in effect.

.IJ DIS (default): When forming lines at print-time, interpret the input like it looks: small variations in right margin indicate ragged right; constant right margin and soft spaces between words indicate justified; confusion of the input scanner is conceivable with unusual text in the document.

.IJ has no effect except when print-time line-forming is ON, that is, when a variable reference has been seen in the current paragraph or when a .PF ON command has been issued.

.IJ is intended to force the action of the input scanner in the (unlikely) event that unusual text confuses it, and for exercising MailMerge. When your intent is to form justified output from ragged right input, or vice versa, use .OJ (above), not .IJ.

EXAMPLES OF PRINT-TIME LINE-FORMING

Printing with Different Margins

To make the right margin be 96 when the text is used with MailMerge, even though you have formed it while editing to a smaller right margin for on-screen readability, use

        .PF ON   force print-time line-forming on
        .RM 96   force print-time right margin to column 96

To revert to printing text as input, with discretionary line-forming at variable insertions, use

        .PF DIS   discretionary print-time line-forming
        .RM DIS   if forming lines, use input right margin

Of course, when you change the margin at print-time, the page breaks will not fall at printout where the editor shows them during editing.

Caution

Changing the margin at print-time is recommended only where there is no text outside the margins, except to the left of the first line of a paragraph (e.g. a section number).

Forcing Ragged Right

To force ragged right printout of text justified during editing, use

```
.PF ON              force print-time line-forming ON
.OJ OFF             force ragged right output
```

The above commands leave the margins and line spacing to MailMerge's discretion; it will follow the input. The input right margin will still be determined according to the appearance of the text: if the text appears justified, all right margin variations will be transmitted line-by-line to the output formatter; if the input text appears ragged right, the input scanner will find the largest right margin in several lines or the entire paragraph, and transmit that value to the output formatter.

Suppressing Print-Time Line-Forming

To suppress print-time line-forming, so that the input lines are printed with no changes except for variable insertions, use

```
.PF OFF
```

For example, suppose your document contains the line

```
&ADDR1& &ADDR2& &ADDR3& &ADDR4&
```

followed by a hard carriage return. Further suppose that this line comes out 120 columns long after insertion of the variables in some instances. If the line is not preceded by other long lines, MailMerge may, if left to its discretion, wrap the line into two or more lines, using the right margin determined at the last soft carriage return, or the editor default right margin (usually 65) if at beginning of file. To prevent such wrap, put .PF OFF before the line, and .PF DIS after the line to return to default discretionary formatting.

Setting Margins

To set the desired margins in cases where unusual input produces output other than as desired. Suppose your document contains the line

```
&NAME&, &ADDR1&, &ADDR2&, &ADDR3&, &ADDR4&.
```

followed by a hard carriage return. Further suppose that this line comes out up to 150 characters long after insertion of the variables. Suppose you wish the line formed into a paragraph of as many lines as necessary, with right margin 55, despite the fact that the preceding text has right margin 60. MailMerge, left to its discretion, may wrap the line into multiple lines, using the right margin determined at the last soft carriage return, or the editor default right margin if at beginning of file. To get the desired forming action, then revert to normal default discretionary forming, use

```
.RM 55
&NAME&, &ADDR1&, &ADDR2&, &ADDR3&, &ADDR4&.
.RM DIS
```

(An alternate, and simpler, method would be to add spaces between the amper-
sands and the variable names to make the line more than 55 characters long,
then form it to right margin 55 with ^B in the editor. The resulting soft
carriage return at column 55 will cause discretionary line-forming to produce
the desired result.)

MAILMERGE OPERATION

This section discusses the initiation, stopping, and resumption of MailMerge.
The reader is assumed to be familiar with operation of the regular print
command (P on the WordStar no-file menu), as described in Section 8.
Reprinting selected form letters from a run, for example to correct them for
erroneous data not previously detected, is also discussed.

MailMerge will operate only if the file MAILMRGE.OVR is on the diskette in
drive A. (The file may alternately be on the diskette in the logged drive, if
a drive other than A is logged; we recommend, however, that you keep
MAILMRGE.OVR on drive A to allow you to change logged drives freely.) The
file MAILMRGE.OVR is supplied with the WordStar/MailMerge enhancement package.

Initiating MailMerge

MailMerge is initiated by pressing M at the WordStar no-file menu. Provided
MAILMRGE.OVR is present, WordStar will next ask:

             NAME OF FILE TO MAILMERGE? ▮

Type in the name of the document file to be used with MailMerge, then press
either ESCAPE or RETURN. As with the regular print command (Section 8),
pressing ESCAPE will cause printing to begin immediately, with all options
defaulted. Pressing RETURN will evoke a series of options questions, as
follows:

             NAME OF FILE TO MAILMERGE?
             For default press RETURN for each question:
                 START AT PAGE NUMBER (RETURN for beginning)?
                 STOP AFTER PAGE NUMBER (RETURN for end)?
                 NUMBER OF COPIES (RETURN for 1)?
                 DISK FILE OUTPUT (Y/N)?
                 USE FORM FEEDS (Y/N)?
                 SUPPRESS PAGE FORMATTING (Y/N)?
                 PAUSE FOR PAPER CHANGES BETWEEN PAGES (Y/N)?
             Ready printer, press RETURN:

If Disk File Output is selected, an additional prompt will be displayed:

             OUTPUT FILE NAME?

and the Ready Printer prompt will not be displayed.

All of the above questions except NUMBER OF COPIES? are the same as for the
regular print commands, and the descriptions in Section 8 apply. In most
cases, it will suffice to press RETURN to most or all of the options ques-
tions.

The PAUSE FOR PAPER CHANGE BETWEEN PAGES option is commonly used when printing form letters, to cause MailMerge to pause at the top of each "page" while you load a new sheet of letterhead stationary into your printer. After inserting the letterhead and positioning it as required, press P to resume printing.

The NUMBER OF COPIES? question is used to print two or more duplicate copies. To print, say, three copies of a document (usually not a form letter), press 3 and RETURN at this question. Between copies, MailMerge will go to the top of the next page, reset the page number to 1, set all the page format parameters (paper length, top margin, character width, etc, as described in Section 7) to their default values, and turn boldface, underline, and the other print enhancements off.

A NUMBER OF COPIES other than 1 or just RETURN is NOT normally entered when printing form letters using a data file. The number of copies does not relate to the number of letters, but to the number of copies of EACH letter. If you answer, for example, three to this question when initiating a MailMerge of form letters, one letter to each recipient will be printed, then the entire set of letters will be printed again, and then again, for a total of three copies of the entire set of letters.

During Printing

While MailMerge is printing, the single-entry MailMerge "menu" appears at the top of the screen

        P = STOP PRINT

to indicate that P may be pressed to stop printing. The portion of the screen below this "menu" is used to display error and warning messages, messages specified by .DM dot commands in the document, and to ask for and accept input of data under the control of .AV dot commands in the document. This area of the screen may also be cleared, via a .CS dot command in the document. When the screen fills with messages, the screen is scrolled up when necesssary to make room to add another message at the bottom.

If file directory display (F command) was left ON at the no-file menu, the file directory will remain on the bottom of the screen until displaced by messages as described in the preceding paragraph. Before using MailMerge with a document which uses the screen for data input, especially a document that repeatedly clears then re-uses the screen, we suggest turning file directory display OFF at the no-file menu.

When MailMerge asks for operator data entry under the control of commands in the document, type the desired data then press RETURN. The usual WordStar control characters may be used (before RETURN is pressed) to correct the entry and/or use the old entry -- ^S, ^D, ^Y, ^R, and others, as described in Table 1-3. In particular, ^R will evoke the previous entry for the same datum (the current value of the MailMerge variable being asked for). To leave the datum unchanged, you need only press ^R then RETURN.

After Printing

When MailMerge completes or is interrupted with the P command, and there are messages on display on the screen, the prompt

> Read screen, then press RETURN: ▌

is displayed. This is to make sure the operator has an opportunity to read everything on the screen, before the screen is cleared and the no-file menu is displayed.

Stopping MailMerge

To stop MailMerge, enter P. The prompt

> TYPE Y TO ABANDON PRINT, N TO RESUME, ˆU TO HOLD ▌

will be displayed, and the printer will stop at the end of the line it is currently printing. To abandon the print, press Y. To leave the print paused, while making it possible to resume later, press ˆU. Entering P later at the no-file menu will resume print. To resume with no intervening commands, press N (or any other key) when resumption is desired.

When MailMerge is awaiting data entry at a .AV dot command (cursor is after a prompt on the lower part of the screen, not after P=STOP PRINT on the upper part of the screen), and you wish to stop print, press ˆU, the WordStar interrupt character. The prompt

> *** INTERRUPTED *** Press ESCAPE key ▌

will appear. Press ESCAPE and P in rapid succession. The "TYPE Y TO ABANDON PRINT ... " will appear next, as described above. If print is later resumed, the request for data entry will be repeated. (This technique of pressing ˆU before pressing P is necessary to cause the P to be taken as a stop print command, rather than as part of the data being requested).

Resuming MailMerge

To resume MailMerge when paused (stopped), press P at the no-file menu. MailMerge can become paused due to a P entered by the operator when printing, due to the operation of the PAUSE BETWEEN PAGES option, or due to a print pause control character (ˆC) in the document being printed. When MailMerge is paused, the status line (top screen line) will show the phrase MAILMERGE PAUSED, the no-file menu will be on the screen, and the line in the no-file menu for P will read P=CONTINUE PRINT.

Reprinting Selected Form Letters

After printing a run of form letters using a data file, you may have several letters you wish to reprint—due to errors in the data file, incorrect insertion of the paper in the printer, a printer paper jam, etc. To reprint selected letters, create a temporary data file containing only the data for the letters to be reprinted, then print the same document file with this temporary data file.

First edit the data file (or use **DataStar**) to correct any bad data, for future use. Then make a copy of the data file and delete the data for the letters that were successfully printed. The deletions can be accomplished quickly using the Find command and block delete. If the document file containing the letter is not set up for operator entry of the data file name, make a copy of it also, and edit in the temporary data file name. Then use MailMerge again to obtain your reprinted letters.

An alternate method of reprinting selected letters is possible using the START AT PAGE and STOP AFTER PAGE options, but only if the document contains no .PN commands. Typically, there will be no .PN in the letter if the letter prints without WordStar-generated page numbers, i.e. if it contains a .OP command. In this case, the (non-printed) page number will increase as the letters are printed. To reprint, for example, the tenth and eleventh one-page letters, invoke MailMerge for the letter document and enter 10 at the START AT PAGE question and 11 at the STOP AFTER PAGE question.

WORDSTAR
WITH MAILMERGE & SPELLSTAR

SPELLSTAR

Section 13
The SpellStar Option

The optional SpellStar program allows you to check a text file for spelling errors and typos, comparing them against the entries in one or more dictionaries on your disk. SpellStar comes with a basic dictionary of some 20,000 English words. You can add more words to this dictionary, create additional dictionaries with SpellStar, and/or use purchased dictionaries after they've been organized into SpellStar's dictionary format through one of the program's Dictionary Maintenance functions. You can update any dictionary by adding and deleting words.

GETTING SPELLSTAR STARTED

To use SpellStar, press S at WordStar's no-file menu. The following prompt will appear on the screen:

NAME OF FILE TO CHECK / ADD TO DICTIONARY?

Pressing ^R will cause the last file you edited to be named automatically as the file to check. As soon as you enter the name of a file and press RETURN, the SpellStar Operations menu will appear:

```
        O P E R A T I O N S

   C   - Check spelling
   M   - Maintain dictionary
   X   - Exit to WordStar no-file menu

Operation? ▮
```

Figure 13-1. Operations Menu

The two main operations you can perform with SpellStar are checking spelling and dictionary maintenance.

When you select either C or M from the Operations menu, you see a menu of controls which govern the operation to follow. You then review the values of the controls and change them, if necessary, before beginning work.

CHECKING SPELLING

When you select C from the Operations menu, to check spelling in
a text file, SpellStar will show you a menu of Spelling Check
Controls.

```
     SpellStar - Spelling Check Operation

        SPELLING CHECK CONTROLS              CURRENT VALUE

   D  - Use another main dictionary  =       A:SPELSTAR.DCT
   S  - Add supplemental dictionary  =
   F  - Change file to be checked    =       A:FILENAME.XXX
   W  - Change work drive            =            A:

 <Return> - Start spelling check.
     X      - Exit to Operations Menu

 Control to change? █
```

Figure 13-2. **Spelling Check Controls**

Spelling Check Controls

The Spelling Check Controls menu allows you to choose a main
dictionary and a supplemental dictionary, change the text file to
be checked, and decide which drive SpellStar should use for the
sorting files it creates (called the "work drive").

Naming a supplemental dictionary to use is optional, but you must
have values for the other three controls (main dictionary, file,
work drive) before SpellStar will allow you to go on with a
spelling check.

D - USE ANOTHER MAIN DICTIONARY

SPELSTAR.DCT is the 20,000-word main dictionary that is "standard
equipment" with SpellStar. You may update this dictionary at
will, as long as disk space permits. (SPELSTAR.DCT as originally
supplied takes about 98K.) You may also make or purchase other
main dictionaries, as long as you put them through SpellStar's
dictionary maintenance process so they're properly formatted.
Naturally, they may then be updated just like the original main
dictionary.

S - ADD SUPPLEMENTAL DICTIONARY

With SpellStar, you can use one additional dictionary during a
spelling check. Using a main dictionary plus a supplemental
dictionary to check a document may catch many more errors.

Typical supplemental dictionaries might contain client or customer names and addresses, scientific terminology, or any business-specific language commonly used in your documents.

You can buy specialized supplemental dictionaries or make your own _via_ the "Create a new dictionary" option in SpellStar's dictionary maintenance process. Again, supplemental dictionaries may be updated at will; their expansion is limited only by disk space.

F - CHANGE FILE TO BE CHECKED

You may use any text or document file that WordStar can read.

W - CHANGE WORK DRIVE

During spelling checks, SpellStar creates its own temporary sorting files containing words from your document.

The "Change work drive" control lets you tell SpellStar where to put its temporary files. The critical factor in your decision is the space available on either disk.

Combined, the sorting files take up about the same amount of space as your document file. Run STAT from the no-file menu to find out how large your document is and whether the sorting files will fit on the same disk.

This is especially important in checking a large file. If you don't have enough space for the sorting files for a large document, divide your document into smaller files and run them one at a time.

Default Controls

Every time you enter SpellStar from WordStar's no-file menu (with A: as the logged disk drive), the current values shown below will come up automatically as default values.

```
         SpellStar - Spelling Check Operation

     SPELLING CHECK CONTROLS              CURRENT VALUE

  D   - Use another main dictionary  =    A:SPELSTAR.DCT
  S   - Add supplemental dictionary  =
  F   - Change file to be checked    =    A:FILENAME.XXX
  W   - Change work drive            =         A:

 <Return> - Start spelling check.
    X     - Exit to Operations Menu

 Control to change? ▮
```

Figure 13-3. Defaults for Spelling Check Controls

The main dictionary value will be SPELSTAR.DCT (the dictionary
that comes with SpellStar) on the logged disk drive.

SpellStar will automatically look on the logged disk drive, or
the A: drive (if you're logged on a drive other than A:) for the
main dictionary you name, as long as you use the extension .DCT.
So you don't always have to specify where the dictionary is.

If you are logged on A: and your dictionary is on B:, you will
have to tell SpellStar where it is by changing the drive letter
in the value.

There is no default value for the supplemental dictionary.
SpellStar will automatically look on the logged disk drive and
the A: drive for the supplemental dictionary you name, as long as
you use the extension .SUP. If you are logged on A: and your
supplemental dictionary is on B:, you will have to tell SpellStar
where it is by changing the value.

If SpellStar cannot find the main or supplemental dictionary
you've specified, it will display an error message after the
checking process begins. Press R for restart and correct the
control value or replace the disk you thought your dictionary was
on with the right one.

The default value for the file to check is the file name you
entered at WordStar's "no-file" menu; SpellStar will assume that
file is on the logged drive unless you specified otherwise at
the no-file menu.

The default for the work drive value is the logged drive.

If the defaults are satisfactory, you may proceed directly to the
spelling check.

Changing Controls

To change any current value, simply select the letter correspond-
ing to the control on the menu. A prompt will appear below the
Controls menu; it will show the control letter, identify the
control, give the current value, and describe the control and how
to change it.

This is a sample prompt for control D, "Use another main
dictionary":

```
D - Dictionary: A:SPELSTAR.DCT This is the current dictionary.
                               Enter the drive, filename, and/or
                               extent of the main dictionary to
                               use.
```

Figure 13-4. Sample Control Prompt

The drive, filename, or extension can be changed separately, or in combination. Even though the cursor always appears at the first character of the value in the prompt, your entry will be inserted into the proper place, if you type it in using the rules below.

If you select any of the four control values to change, then decide to leave it the way it is, press RETURN to leave it unchanged. This works whether the control value contains information or is blank.

Note

Normal WordStar cursor movement commands like ^S, ^D, and so on do not work in any part of SpellStar, except "Fix word" during the correction step. In entering and changing values for all controls on the Spelling Check menu, as well as all controls and options on the Dictionary Maintenance menu, you may correct mistakes by backing up with the "Backspace" key or with ^H and retyping.

RULES FOR CHANGING THE D, S, AND F CONTROLS

To change the drive only, simply type the drive letter you want, colon, and press RETURN.

To change the filename only, type the new filename, and press RETURN.

To change the extension only, type a period, the new extension, and press RETURN.

To change two or three elements at once, just type the elements of the new value in the proper order and press RETURN.

To erase the drive, filename, or extension of a control value, leaving it blank, select the letter of the control value you wish to change. Then, to erase the drive, type "#:", RETURN. To erase the filename, simply type "#", RETURN. To erase the extension, type ".#", RETURN.

You can erase the whole control value for D, S, or F at once by selecting the letter for that control value, then pressing the space bar once, and RETURN.

RULE FOR CHANGING THE W CONTROL

You cannot erase the value of the work drive; you can only change it to another drive, by typing the letter. No colon is required, nor do you have to press RETURN.

If you can't remember on which drive your dictionary or document
file is located, you can exit to the Operations menu by pressing
X, and to WordStar's no-file menu by pressing X again. Then check
the disk directories to locate your files.   Return to the
Spelling Check Controls menu by selecting S at the no-file menu,
typing in the file name at the prompt, then selecting C at
SpellStar's Operations menu.   You'll find that the Controls menu
again registers the default values, because you exited to
WordStar; you will have to reset the values for your spelling
check.

Running the Spelling Check

After the spelling check controls are set, press RETURN to begin
the spelling check on the text file.

PROOFREADING THE FILE

SpellStar "proofreads" your document by first counting and
sorting the words in the text/document file, and counting the
words in the main and supplemental dictionaries you've specified.
Then it compares the text file words with those in the dictionary
or dictionaries specified.   The sample on-screen summary shown
below reflects the results of the proofreading.

```
 SpellStar is now checking your document for misspelled words.

         Number of words in document.......: 422
         Number of different words.........: 261
         Number of words in main dictionary: 21182
         Number of words in supplement.....:
         Number of dictionary words checked: 21128
         Number of misspelled words........: 28
         Total number of misspellings......:
```

Figure 13-5. Spelling Check Summary

The "different" words in the document are the unique words left
after cancellation of duplicates.

The changing number on the fifth line, "Number of dictionary
words checked," indicates how far SpellStar has gotten with your
spelling check.

A "misspelled word" is any word that doesn't match up with a word
in the dictionary or dictionaries specified. So, a "misspelled
word" can be either:

- a misspelling (or a typo) of a word in your dictionary,

                              OR

- a word that is not in your dictionary, spelled
  correctly or incorrectly.

SpellStar leaves the "total number of misspellings" blank until
later.

At this point in the spelling check, SpellStar has not yet
actually flagged the errors within the text file. So, you can
elect to see listed on the screen all the misspellings, typos,
and words unmatched in the dictionary; or you can leave the
spelling check at this point without affecting your file.

Listing the words apart from the text file at this point can be a
handy double-check that you specified the right dictionary. If
you see many words listed you thought were in the dictionary,
leave the spelling check (press R for "restart," then C at the
Operations menu) to go back and check whether the specified main
or supplemental dictionary is the right one. Restart the
spelling check.

If, in a listing of misspelled words, the list exceeds one
screenful, a message will appear at the bottom of the screen
giving commands to go on to the next screenful (space bar),
scroll the list continuously (C), or stop the listing entirely
(^L).

At the end of the listing, you may tell SpellStar to proceed with
flagging the errors, or return to SpellStar's Operations menu.

FLAGGING THE FILE

When SpellStar flags the document file, it inserts a ^@ marker in
front of every misspelled word it has found in the proofreading
step.

SpellStar treats compound words (two words joined with a "hard"
hyphen) as two separate words. The hyphen you insert to make a
compound word is a hard hyphen. If you use a hard hyphen at the
end of a line to split a word into two parts, SpellStar will
treat the two parts as separate words, and they probably will be
flagged as misspelled.

SpellStar ignores word parts separated by a "soft" hyphen. You
use soft hyphens at the ends of lines in WordStar, when hyphen-
help or the soft hyphen feature is on.

Dot commands will not be flagged. Any character string following
a period in column one is ignored.

Single letters, like those in outlines, are also not flagged.

While flagging the document, SpellStar creates a file with the
same filename as the document file, but with the extension @@@.
This file contains your document with all the errors flagged.
Once this file is created, the files SpellStar used to sort the
words in your document disappear.

The .@@@ file will be placed on the same disk as the document
file, unless you specify otherwise when you enter the name of the
document file at the no-file menu. Do this by typing a space
after the file name, then the letter of the drive where you want
the .@@@ file, followed by a colon and RETURN.

This option also controls the location of the final, corrected
file; when you correct the errors in the .@@@ file, it is renamed
with the original name and extension of the document file. The
original document (still containing the errors) becomes a .BAK
file.

When the flagging is completed, the document may be corrected; or
SpellStar may be ended, leaving the document flagged but not
corrected.

CORRECTING THE FILE

When you press RETURN, SpellStar will display the first part of
the document where it has flagged errors, with a correction
action menu above.

```
  A:FILENAME.@@@   PAGE X LINE X COL XX    ACTION [F/B/I/D/S]?

         F - Fix word      D - Add to dictionary
         B - Bypass word   S - Add to supplemental dictionary
         I - Ignore word


  L----!----!----!----!----!----!----!----!----!----!----!--------R
```

Figure 13-6. Correction Menu

The cursor will appear flashing at the first flagged word; the ^@
marker will have been removed. (The word may also appear high-
lighted or dimmed, depending on your terminal.) The five
possible actions you may take on each word are listed above.

If a word is flagged, it simply means it is not in the dictionary. It could be misspelled, or it could be correctly spelled -- you must determine that yourself. You also have no way of knowing if a misspelled word is in the dictionary in its correct form or not, as long as you are in the correction phase. You can, however, make a note of the word and find out later if it is in the dictionary.

If the word is misspelled and you want to correct it, select F for "Fix word." You will automatically get WordStar's edit mode. With the full range of WordStar's editing capabilities available to you, you can correct the spelling, reformat the paragraph if necessary, and make any other changes in the document that might occur to you.

(When you reformat a paragraph with ^B after fixing a word, you will see the cursor go to the end of the paragraph whether or not there are any other flagged words in the paragraph. If this causes you to skip any flagged word[s], you can go forward in the document with ^L and return to the word[s] you skipped when you reach the end of the document; or you can move the cursor to any point in front of the word[s] you skipped [^QE, for instance, will move you to the top of the screen], then press ^L.)

If you select F and don't change the word, it will no longer be marked as misspelled.

After selecting F, no matter what action you do or do not take on the word, you must press ^L to go forward from the cursor to the next flagged word. To go backward from the cursor to the next flagged word, if any, press ^QL, then B.

If you suspect a flagged word is misspelled, but want to wait until you have gone through the whole document before looking it up, you can select B to bypass the word. It will remain flagged, and you can come back to it later.

When you select I for "Ignore word", SpellStar removes the flag from the word and goes on to the next word. Use this when the flagged word is correctly spelled, and is one that appears only in this document, or rarely in your writing (so that you would not need to have it in one of your dictionaries). Proper names often fall in this category.

SETTING ASIDE WORDS FOR A DICTIONARY

When SpellStar has flagged a word that is spelled correctly, and you decide to add it to a dictionary, use the D or S commands. SpellStar will ask you to confirm the addition, with a YES/NO prompt above the menu.

When you choose "add to dictionary" or "add to supplemental dictionary" during the correction phase, SpellStar simply assigns the word to one of two groups: the "D" words and the "S" words, and sets them aside in a file it creates and names with the filename of the checked document plus the extension .ADD. SpellStar creates a .ADD file for each document you check, whether you add words to a dictionary or not.

You use the .ADD file later, in a dictionary maintenance run, to actually add the words it contains to one or more dictionaries. SpellStar "knows" that the "D" words go to a main dictionary and the "S" words to a supplemental dictionary, but it doesn't insist on doing the maintenance run that way if you instruct it otherwise. That is, when you actually run maintenance for the .ADD file, you could add the words to or delete words from any dictionary you name. The words you selected (with "D") to add to the main dictionary can also be added to a supplement if you like, or vice versa.

If you think you may recheck your document before adding the first run's .ADD file to any dictionary, saving the .ADD file can be a definite advantage. If you return to your checked document a second time, you should see SpellStar by-pass some of the flagged words. It still remembers the last 20 "add" and "ignore" words you gave it during the first pass.

In any spelling check, if you choose D or S and respond with "no" to the question, SpellStar will require you to choose another action (F, B, or I) for that word before going on to the next word.

"IGNORE" AND "ADD" INSTRUCTIONS REMEMBERED BY SPELLSTAR

The words you tell SpellStar to ignore or to add to a dictionary will be remembered the next time they appear in the same document, and the cursor will not stop at them. SpellStar can remember "ignore" and "add" instructions approximately 20 words at a time (128 bytes). When its memory capacity is exceeded, it remembers the most recent 20 or so words.

HIDING FLAGS

To see your document without flags, use the ^OD command while you're in WordStar's edit mode fixing a misspelled word. Doing this allows you to see the margins the way they would appear in a printout, without the distortions caused by the flags.

INTERRUPTING THE CORRECTION STEP

To interrupt the correction of a document, press ^U, ESCAPE. This will put you in WordStar's edit mode, and you can press ^KD to save what you have done. When you come back to the file later, SpellStar will take up where you left off. (However, if you want to print the file, the flags will appear.)

DOUBLE-CHECKING THE CORRECTIONS

When you get to the end of the correction phase, it's advisable to go back through the document and make sure all the flags have been removed. After you've chosen an action for the last flagged word in the file, the message "Spelling Check Completed*** Press ESCAPE Key" will appear. Press ESCAPE, then ^QL, and either B (to search backward from the cursor) or G (to search from the beginning of the file).

LEAVING THE DOCUMENT FILE

When you've finished correcting your document, save the file with ^KD. Your file will now be the corrected version, and the back-up file (.BAK) will contain your document, with errors, as it was before you corrected it.

If you press ^KQ, the correction work you have done will not be saved, and all the flags will be restored to the file. (You can print the file, but all the flags will appear in the printout.) ^KQ will leave the file .@@@ and the original file will not be renamed to .BAK.

CORRECTING THE DOCUMENT LATER

If you don't correct your document immediately after SpellStar has "proofread" and "flagged" it, you can do it later. When you decide to correct it, go to WordStar's no-file menu, press D to open a document file, and respond to the prompt with the name of your document file with the extension .@@@.

When the text of the file appears on the screen, press ^QL and you will get the following prompt:

 To search for misspelled words, enter one of the following –
RETURN=search forward, B=search backward, G=from start of file: ▌

Simply enter the command for the direction from the cursor in which SpellStar should begin searching for flagged words. If you choose B or G you must also press RETURN. All other correction actions remain the same.

A Reminder: General SpellStar Commands

If you requested an action of SpellStar and nothing happened, or if you made an entry and it didn't take effect, you probably didn't press RETURN.

In all prompts, R ("Restart") means return to SpellStar's Operations menu. When all else fails, you can abort a function in SpellStar with ^U. If SpellStar is asking you a question, you must answer it before you can interrupt the function. If SpellStar is sorting a file, you must wait until it's done before ^U will take effect. You cannot use ^U while listing words a screenful at a time.

DICTIONARY MAINTENANCE

Dictionary maintenance in Spellstar includes both updating
existing dictionaries by adding or deleting words, and creating
new dictionaries.

When you select M from SpellStar's Operations menu, to run
dictionary maintenance, SpellStar shows you a menu of Dictionary
Maintenance Controls and Options:

```
        SpellStar - Dictionary  Maintenance

        DICTIONARY MAINTENANCE CONTROLS            CURRENT VALUE
F  - Change word file to use                 =   A:FILENAME.XXX
D  - Change dictionary to update             =   A:SPELSTAR.DCT
U  - Change name of new or updated dictionary =  A:
W  - Change work drive for sort              =        A:


        DICTIONARY MAINTENANCE OPTIONS
N  - Create a new dictionary                 =   NO
A  - Add words                               =   NO
T  - Delete words                            =   NO
C  - Combine add/delete                      =   YES
S  - Use "S" words from ".ADD" file          =   NO
L  - List dictionary words                   =   NO

<Return> - Start dictionary maintenance.
   X     - Exit to Operations menu

Control or option to change? ▌
```

Figure 13-7. Dictionary Maintenance Controls and Options

Dictionary Maintenance Controls

The Dictionary Maintenance Controls menu lets you choose the file
of words with which you will update or create a dictionary (word
file), the dictionary to update, the name of the new or updated
dictionary, and the drive to receive temporary sorting files
(work drive). You must always have a word file, a work drive, and
either a dictionary to update or the name for your new
dictionary.

Techniques for changing dictionary maintenance and spelling check
controls are the same. (Refer to page 13-5 for a detailed
explanation of these techniques.) In summary, they are: Change
the drive, filename, or extension separately or in combination by
typing in new information over what's already there. Use the '#'
key to blank out any portion of the control. Use the space bar
to cancel the entire control; and press RETURN alone to leave the
control unchanged.

If you make a mistake when you're typing in the new value for a
control, you can use the back space key or ^H to erase your
mistake.

When you enter SpellStar, logged on the A: drive, the default
values for the dictionary maintenance controls will appear as
they do in Figure 13-7. These defaults will not recur during
successive SpellStar operations without exits to WordStar; in
those cases, current values will show information entered for the
preceding operation.

F - CHANGE WORD FILE TO USE

The word file may contain words for updating (adding to or
deleting from) a dictionary; or it may contain words to create an
entirely new dictionary.

The default value for the word file is the file name you entered
at the no file menu in response to the prompt NAME OF FILE TO
CHECK / ADD TO DICTIONARY?

There are four kinds of word files:

    1.   A document file
    2.   A file of words you put together especially for this
          purpose
    3.   The .ADD file SpellStar creates as you correct a
          document
    4.   An on-disk dictionary you purchase.

If you want to add all the words in your document to a dictionary
(or delete them, or create a new dictionary with them), just name
the document file as the word file to use. SpellStar will ignore
all the duplicate words, and use the rest.

You can also create a brand new word file in the edit mode of
WordStar, simply by making a list of words. If you do this, it's
a good idea to include all the forms of each word (plural,
tenses, -ing form, possessive).

In most of the dictionary maintenance you do, you will use the
.ADD file. When you set aside words to add to a main or
supplemental dictionary (by selecting S or D) as you do a
spelling check of a document, SpellStar creates a file to hold
those words. It has the same filename as your document, with the
extension .ADD.

You can use those words in any way you please. The .ADD file
remains on your disk until you erase it. So if you make a
mistake, and put your .ADD words in the wrong dictionary, you can
easily take another step that deletes them as a group.

It is possible to buy main dictionaries, as well as dictionaries
of legal terms, medical terms, etc. which would be useful as
supplemental dictionaries. Just make sure you run them through

the dictionary creation process so they will be useable by SpellStar.

You cannot use a SpellStar dictionary as a word file, because it has been created by the dictionary maintenance process and isn't formatted the way word files must be. This means you cannot merge two SpellStar dictionaries together.

Remember, all four kinds of word files must go through dictionary maintenance to actually be integrated with existing dictionaries or to be organized in the proper format for SpellStar to use.

D – CHANGE DICTIONARY TO UPDATE

The "dictionary to update" can be either a main or supplemental dictionary that you want to add words to or delete words from. (When creating an entirely new dictionary, leave this control value blank.)

The default value for this control is SpellStar's main dictionary, SPELSTAR.DCT, on the logged disk drive.

If you use the extensions .DCT and .SUP for your main and supplemental dictionaries, SpellStar will automatically look on the logged drive and the A: drive for your dictionary to update (just as it does in the spelling check operation).

U – CHANGE NAME OF NEW OR UPDATED DICTIONARY

Use the U control, "Change name of new or updated dictionary" to name a new dictionary you are creating, or to specify a new name or disk drive for the dictionary resulting from an update.

The default for this control is the logged drive, followed by a blank. If the filename is left blank, and the drive matches the one for the dictionary being updated, the old dictionary will be replaced by the updated dictionary, and the name will not change.

If you want to retain your old dictionary to use again, give the updated version a new name with the U control. Remember, when choosing names for dictionaries (either new or updated), it's useful to name main dictionaries with the extension .DCT, and supplements with .SUP, so that SpellStar will recognize them.

Caution

When deciding what to use as the value for the U control, it's important to consider disk space requirements. Every maintenance run uses some additional space, even if it does not result in an additional dictionary.

In the case where SpellStar replaces the old dictionary with the updated one, first a file is created to contain the updated dictionary, then SpellStar deletes the old one. So, for the duration of the procedure, you must have enough space for both

the old and updated dictionaries. The updated dictionary is equal in size to the old dictionary plus one half the word file (if you are adding words) or minus one half the word file (if you're deleting words).

When you're creating a new dictionary, the space needed for the resulting dictionary is the same as one half the size of the word file.

It's wise to check disk space with the STAT program before beginning a dictionary maintenance run. If you haven't done so, you can exit from the Dictionary Maintenance menu to the Operations menu, and from there, to WordStar, without hurting anything.

If you don't have enough space for the results of the update on the disk containing your old dictionary, make sure there is a disk with sufficient space in the other drive. Then name that drive for the updated dictionary and remember to delete the old dictionary when the run is complete.

W - CHANGE WORK DRIVE FOR SORT

SpellStar creates temporary files to sort the word file in the first step of every maintenance operation. Combined, these sorting files require approximately the same amount of space as the word file. With the "Change work drive for sort" control, you decide where the temporary files should go. The default value is the logged disk drive.

Once again, in order to know which of your disks has enough space to accept the temporary sorting files, you would have to run STAT from WordStar's no file menu.

Dictionary Maintenance Options

The Dictionary Maintenance Options menu lists the various maintenance options (or actions) to choose from:

```
      DICTIONARY MAINTENANCE OPTIONS
 N  - Create a new dictionary                  =    NO
 A  - Add words                                =    NO
 T  - Delete words                             =    NO
 C  - Combine add/delete                       =    YES
 S  - Use "S" words from ".ADD" file           =    NO
 L  - List dictionary words                    =    NO

<Return> - Start dictionary maintenance.
    X       - Exit to Operations menu

Control or option to change? █
```

Figure 13-8. Dictionary Maintenance Options

A maintenance option is chosen by making the value read "YES."
Select the letter for the action you wish to perform; when the
corresponding prompt appears at the bottom of the screen, press Y
for YES.   You cancel an option by selecting its letter and
pressing N for NO at the prompt.

The default values on this menu are YES for "Combine add/delete"
and NO for the rest of the options.

Some of the options are mutually exclusive, that is, you can do
only one at a time.   SpellStar will automatically cancel the
previously chosen option (by changing the YES to NO) when you
choose a conflicting one.

N - CREATE A NEW DICTIONARY

Use the N option, "Create a new dictionary," to produce a main or
supplemental dictionary with the words in your word file.   (The A
option, "Add words," will automatically acquire a YES value when
the N option is chosen.)

You can create as many dictionaries as you like, storing them on
disks other than the one SpellStar is on, and either copying them
onto the SpellStar disk when you need them, or using two disks to
run your spelling check.

A - ADD WORDS

Use the "Add words" option when you want to add to a main or
supplemental dictionary.   (This option will automatically be
activated by SpellStar when the N option, "Create a new
dictionary," is chosen.)

You can use any of the four kinds of word files described on page
13-13 as a source of words to add to your dictionaries.   You
cannot add one SpellStar dictionary to another.

If you ask SpellStar to add a word that is already in the
dictionary, no harm is done.   It will not cause any duplication
in the dictionary; SpellStar will simply ignore the request.

If you are using an .ADD file to add words to a main dictionary,
SpellStar will add only the words that you set aside for this
purpose (by selecting D) when you were correcting the document
that corresponds to the .ADD file.   If you change your mind, and
decide you want to add those words to a supplemental dictionary
instead, simply name the supplemental dictionary as the value of
the D control, "Change dictionary to update."

When you name an .ADD file as your word file, SpellStar will use
only the "D" words in that file, unless you tell it otherwise.
To use the words you set aside to add to a supplemental
dictionary (by selecting S when correcting the document), you
must choose the S option, "Use 'S' words from '.ADD' file," along
with the A option, "Add words." Even though you made the choice
to add these words to a supplement when you were making
corrections, they can be added to a main dictionary if you so
choose.

You cannot perform a dictionary maintenance run using both the
"D" and "S" words at once.

T - DELETE WORDS

Use the T option, "Delete words," to erase words from your
dictionaries that don't belong.

You will need this option if you make a mistake and add words to
the wrong dictionary. Simply name the word file that contains
the words you added in error, and the dictionary to which they
were added, and choose the T option to delete them.

You will also use this option if you add any misspelled words to
a dictionary by mistake. Or you might review one of your
dictionaries with the L option, "List dictionary words," and
discover words that you never use.

Write down all the words you wish to delete from a particular
dictionary, then create a word file using WordStar's D command
("Open a document file") and enter these words in any order. Then
name that word file as the value of the F control, "Change word
file to use," name the dictionary to delete them from as the
value of the D control, "Change dictionary to update," and delete
the words from the dictionary with the T option.

When you create a word file of words you want to delete from a
dictionary, you can name that file anything you like. It may be
helpful to give it a filename that corresponds to the dictionary
containing the words you want to delete, and the extension .DEL,
to help you remember what it's for.

C - COMBINE ADD/DELETE

"Combine add/delete" is a timesaving option that allows you to do
two maintenance operations at once.

To use this option, create a file with WordStar that contains
words you want to add to a particular dictionary, as well as
words you want to delete from it. The words may be entered in
any order. Choose a name for this file that will identify its
contents--perhaps the filename of the dictionary with the
extension .CMB.

Then name your file as the word file to use and name the
dictionary as the one to update. Select option C, "Combine
add/delete." SpellStar will compare the words in your word file
to the dictionary words. In one step it will add words from the
word file that aren't already in the dictionary, and delete any
words already there.

When using "Combine add/delete," make sure the words you want to
delete from the dictionary are actually in it; if they're not,
SpellStar will <u>add</u>, rather than delete, them.

During this procedure SpellStar will ask for confirmation before
it deletes a word by displaying the word at the top of the screen
along with a prompt that says, "This word is in the dictionary.
Should it be deleted? (Y/N)."

S - USE "S" WORDS FROM ".ADD" FILE

This option allows you to add words to, delete words from, or
create a dictionary with the "S" words in your .ADD files. These
are the words you tell SpellStar to "mark" with an S and save in
the .ADD file when you make corrections in a document.

To use these words, name the .ADD file as the word file to use.
To add them to a dictionary, name the dictionary as the one to
update and choose options A and S. To delete them from a
dictionary, name that dictionary as the one to update, and choose
options T and S. To create a supplemental dictionary with the
"S" words, invent a name for the dictionary and make it the value
of the "...new or updated dictionary," leave the "...dictionary
to update" control blank, and choose options N, A, and S.

L - LIST DICTIONARY WORDS

The L option, "List dictionary words," lets you list on screen
both the words in your word file and the new or updated
dictionary, during a maintenance run.

The L option cannot be implemented without one of the other
options. If you just want a list of the words in a dictionary,
but don't want to add or delete words, or create a dictionary,
you do so by making up a dummy word file. Create a word file and
put one word in it. (Use any word that you know to be in the
dictionary you want to list.) Then set up a dictionary
maintenance run in which you specify that word file, the
dictionary you want to list as the dictionary to update, and
choose options C and L.

SpellStar will go through the entire dictionary, listing the
words, and when it comes to the word in your word file it will
ask you if you want to delete it. You can respond with N for no,
and SpellStar will continue listing the dictionary words. You
will be able to examine the complete list of words without
changing your dictionary.

You cannot make SpellStar print out the dictionary. You can get a printout of a word file by using WordStar's "Print a file" command. If you try to print a .ADD file, you will get some extraneous characters along with the words.

X - EXITING FROM THE DICTIONARY MAINTENANCE MENU

You can exit from the Dictionary Maintenance menu to SpellStar's Operations menu any time you want by pressing X. If you do not then exit to WordStar, your control and option values will remain as you left them, otherwise you will get the default values when you return.

Running Dictionary Maintenance

Begin a maintenance operation when the controls and options are set up the way you want, by pressing RETURN.

While the maintenance run is going on, the display on your screen will look like this:

```
   SpellStar is now creating/updating your dictionary:

       Number of words in word file................:
       Number of different words in word file......:
       Number of words in dictionary being updated.:
       Number of words added to dictionary.........:
       Number of words deleted from dictionary.....:
       Number of words in new or updated dictionary:
```

Figure 13-9. Dictionary Maintenance Summary

Notice that in the status line (not shown here), the name of the new or updated dictionary appears in the upper right-hand corner.

The first step of any maintenance operation is a count of the words in the word file. If you've named a .ADD file as your word file, SpellStar will tell you the number of either the "D" or the "S" words, depending on which you've chosen to use.

Then you find out how many of those words are different from each other (non-duplicates). Usually those two numbers will be the same, except that when you use a document for a word file there will be duplicate words, and the numbers will be different.

At this point, SpellStar will pause and give you the list of words in the word file, if you've selected option L, "List dictionary words."

The word file list will appear on the lower half of the screen. If you're using 'D' or 'S' words from a .ADD file, then only those words will be listed. Otherwise, all the words in the word file will appear.

The words will be listed alphabetically by length, since that's the way they have been sorted for integration with a dictionary.

If the word file listing takes more than one screen, at the bottom of each screen this message will appear:

"Space"=continue, "C"=continuous listing, "^L"=stop/start list.

At the end of the list, the message "Enter <Return> to proceed, 'R' to restart" will appear.

When you see the list, you can make sure these are really the words you wanted to use. If they are not, you can press R for "restart," which will take you back to the SpellStar Operations menu. From there, you can go to the Maintenance Controls menu and choose another word file.

When the listing of the word file is complete, press RETURN to have SpellStar proceed with the maintenance operation. SpellStar will begin to fill in numbers on the remaining lines of the summary in Figure 13-9.

The changing numbers in the third and sixth lines tell you how many words have been sorted through in the dictionary being updated, and how far SpellStar has gotten in creating the new or updated dictionary. The fourth line changes as words are added, and the fifth changes as words are deleted from your dictionary.

When SpellStar adds or deletes words in a dictionary maintenance procedure, it goes through every word in the dictionary and creates a new file. That's why it keeps going after it has added or deleted all the words in your word file.

While the run continues, you will also see SpellStar list, by screenful, the words that will be in your dictionary after it's been updated, if you've chosen option L. SpellStar stops updating for as long as you want to look at this list. When you're ready, you can go on to the next screenful of words, or you can make the list scroll continuously.

If you look at one screenful of words at a time, SpellStar will update at the same rate. If you list the words continously, the run will go on at that pace. If you stop the list entirely, SpellStar will go ahead with the update at a faster rate. You can begin listing words again at any point, and the list will pick up wherever SpellStar is in the dictionary.

The commands you use to stop and start the listing of dictionary words are the same ones you use with the word file list:

"Space"=continue, "C"=continuous listing, "^L"=stop/start list.

If you interrupt a maintenance run by re-booting, the sorting
files will remain on your disk. They will show up on your file
directory as follows: one will be named with the filename of the
dictionary you were creating or updating, and the extension .@@4,
and the other will consist of the filename of the word file plus
the extension .@@2. These files may be deleted without harming
anything.

When the maintenance run is completed, SpellStar will show you
this message below the summary:

        SpellStar has completed the dictionary maintenance.
        Enter <Return> to return to WordStar, "R" to restart.

You can exit to WordStar's no-file menu by pressing RETURN, or go
to the Operations Menu with R if you want to do another spelling
check or maintenance procedure.

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